SCIENTIFIC AMERICAN

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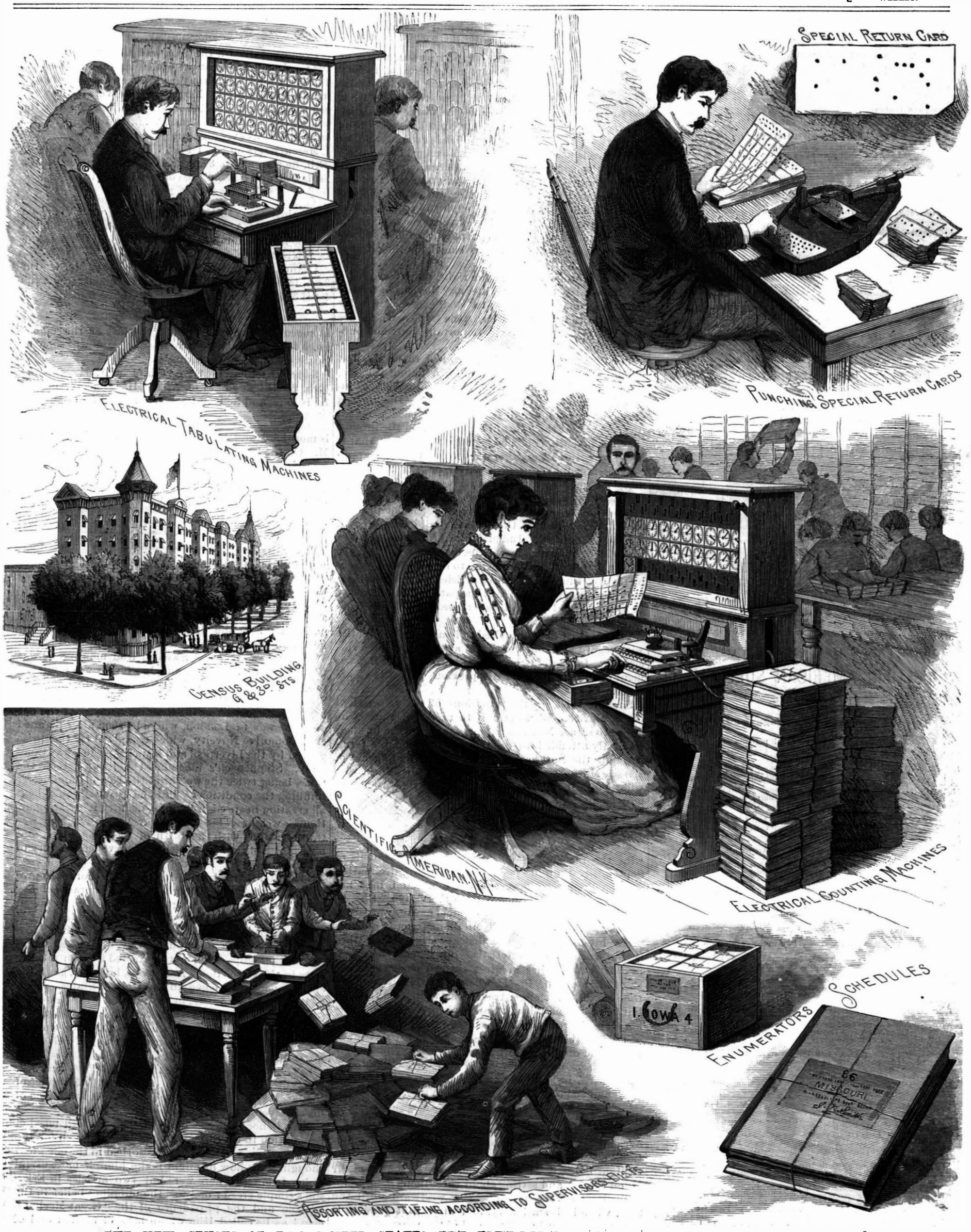
A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. LXIII.—No. 9. ESTABLISHED 1845. | NEW YORK, AUGUST 30, 1890. | $3.00 A YEAR. WEEKLY.



THE NEW CENSUS OF THE UNITED STATES—THE ELECTRICAL ENUMERATING MECHANISM.—[See page 132.]

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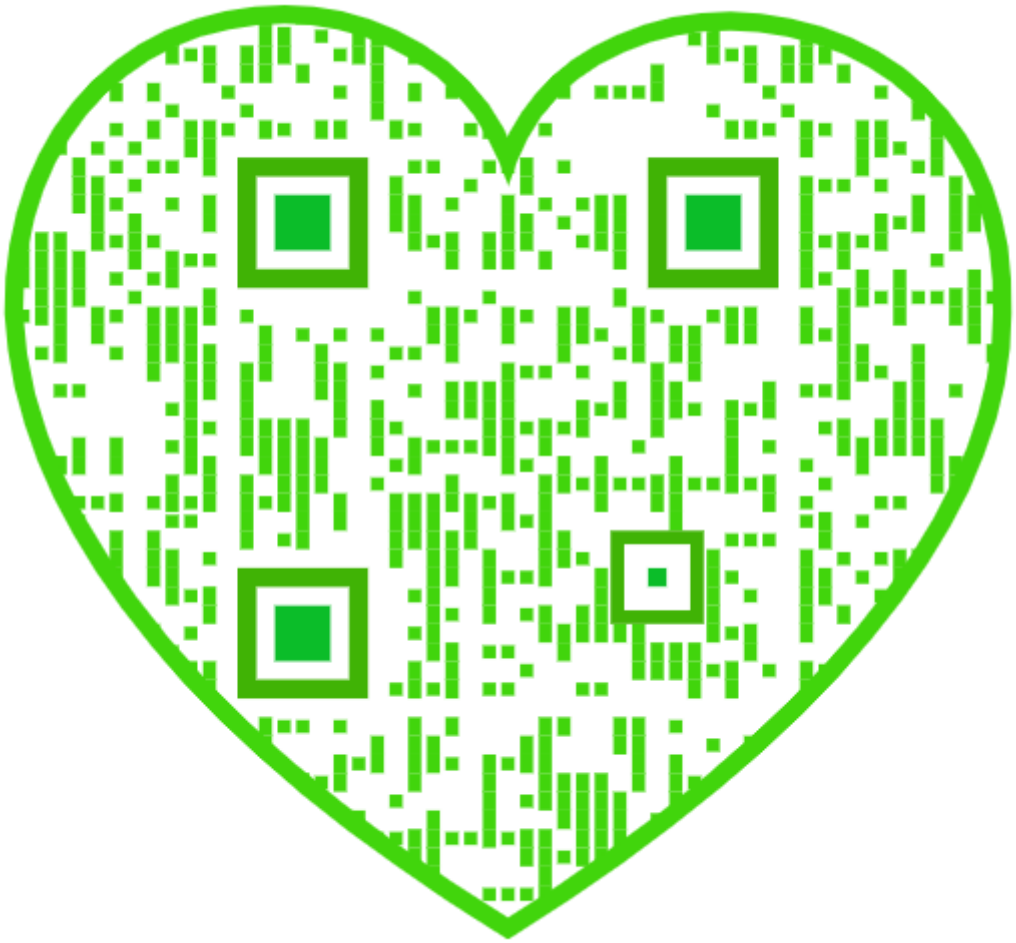

Scientific American.

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors.

PUBLISHED WEEKLY AT

No. 361 BROADWAY, NEW YORK.

O. D. MUNN. A. E. BEACH.

TERMS FOR THE SCIENTIFIC AMERICAN.

One copy, one year, for the U. S., Canada or Mexico..... .....$3 00
One copy, six months, for the U. S., Canada or Mexico. 1 50
One copy, one year, to any foreign country belonging to Postal Union. 4 00
Remit by postal or express money order, or by bank draft or check.
MUNN & CO., 361 Broadway, corner of Franklin Street, New York.

The Scientific American Supplement

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MUNN & CO., Publishers,
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NEW YORK, SATURDAY, AUGUST 30, 1890.

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THE NEW PATENT LAW OF MEXICO.

A new law relating to patents has been passed recently by the Mexican congress, and is now in operation. It is, on the whole, of a satisfactory and liberal nature, well calculated to encourage inventors and stimulate the introduction of new industries within our sister republic.

Under the former law the obtaining of a patent in Mexico was a peculiar and somewhat difficult operation. A special act of the Mexican congress was necessary for each patent, a government official fixed the fees, which varied according to the supposed importance or value of the invention, the member of the legislature who took charge of the case expected to receive an *honorarium*. Altogether the inventor was pecuniarily bled at several points, and was obliged to submit to long and tedious delays.

By the terms of the new law any person, native or foreign, may obtain a patent for the term of twenty years, with privilege of extension for five additional years. The official fees for the first term vary from $50 to $150. The invention must be worked, or all necessary steps taken to work it, within five years from the date of the patent. No official examination or guarantee is made respecting the novelty of the invention or the sufficiency of the specifications. Patents will be granted for inventions already patented in other countries, but the term of the Mexican patent will expire in such cases with the expiration of the first foreign patent. Patentees have the exclusive right for one year after the issue of a patent to file supplementary applications for improvements on the original patent.

The government reserves the right, on payment of a fair indemnity, to appropriate any invention for the public use, on the ground of national expediency or for the reason that the patented article is of such a nature that its free use would be an important source of public wealth.

The first applicant is to be presumed to be the first inventor. When an application for a patent is made, the petition is published in the official gazette at intervals of ten days during two months. During this period any person may institute interference proceedings to prevent the grant of the patent, on the ground that the invention claimed is not patentable or that it is the invention of another person, or that the applicant is not the original inventor or not the legitimate assignee of the original inventor. As between two persons claiming the same invention, the first inventor shall be entitled to the patent; if the priority cannot be determined, the patent shall be granted to the first applicant. Judicial authority shall review the evidence and adjudicate the matter.

All patents and drawings are to be published yearly by the government. Patented articles are to be stamped with the date and number of the patent. Patents may be assigned, and the transfers recorded in the Department of Public Works.

The President is authorized to issue rules of practice with regard to the new law, and also to establish a special office for patents in connection with the Department of Public Works. All previous patent laws are repealed.

Such, in brief, are the provisions of the new patent law of Mexico. We have only to add that those who desire to secure Mexican potents may have the business promptly attended to on the most reasonable terms through the SCIENTIFIC AMERICAN patent agency of Messrs. Munn & Co., 361 Broadway, New York, who will furnish to applicants such other information as may be desired.

POSITION OF THE PLANETS IN SEPTEMBER.

VENUS

wins the place of honor on the planetary annals of September, though her great southern declination shortens her stay above the horizon, and brings her into unfavorable conditions for observation. She is, however, a beautiful object to behold as she approaches the earth, increasing rapidly in diameter, and glowing more intensely with the delicacy of coloring that is her marked characteristic. She reaches an epoch in her course, her greatest eastern elongation, on the 23d, at 11 h. P. M., when she is 46° 34′ east of the sun. She no longer travels eastward from the sun, but, as if bound to him by an invisible chain, retraces her steps, increasing her speed, and taking on the form of a beautiful crescent, as she makes her way toward her period of greatest brilliancy.

Venus sets on the 1st at 8 h. 2 m. P. M. On the 30th, she sets at 7 h. 15 m. P. M. Her diameter on the 1st is 20″.2, and she is in the constellation Virgo.

JUPITER

is evening star. He is superb as he pursues his course over his celestial path, in spite of his southern declination, becoming visible in the southeast before the twilight fades, reaching the meridian at 9 h. 40 m. P. M. on the 1st, and setting about three hours before sunrise. His course is retrograde or westward until the 28th, when he is stationary, and after that time it is direct or eastward until the end of the year.

Jupiter sets on the 1st at 2 h. 20 m. A. M. On the 30th, he sets at 0 h. 20 m. A. M. His diameter on the 1st is 44″.6, and he is in the constellation Capricornus.

MARS

is evening star. He is in quadrature with the sun on the 21st, at 4 h. P. M., being then 90° east of the sun. He travels eastward during the month, and passes beyond the bounds of Scorpio into Sagittarius, his approach to Jupiter being easily perceptible. His decrease in ruddy luster is noticeable, and his diameter has decreased nearly one-half since his opposition in May.

Mars sets on the 1st at 10 h. 37 m. P. M. On the 30th, he sets at 9 h. 58 m. P. M. His diameter on the 1st is 12″.0, and he is in the constellation Scorpio.

MERCURY

is evening star until the 29th, and then morning star. He reaches his greatest eastern elongation on the 3d at 4 h. A. M. He is at that time 27° 5′ east of the sun and may be picked up by sharp-eyed observers in the western twilight. He reaches inferior conjunction with the sun on the 29th at 2 h. 3 m. P. M., and completes his swift course as evening star.

Mercury sets on the 1st at 7 h. 16 m. P. M. On the 30th, he rises at 5 h. 30 m. A. M. His diameter on the 1st is 6″.8, and he is in the constellation Virgo.

URANUS

is evening star. He is in conjunction with Venus on the 2d at 4 h. A. M., being 2° 6′ north. The planets will be near each other on the evening of the 1st, and be interesting telescopic objects.

Uranus sets on the 1st at 8 h. 11 m. P. M. On the 30th, he sets at 6 h. 22 m. P. M. His diameter on the 1st is 3″.5, and he is in the constellation Virgo.

SATURN

is morning star. He rises on the last of the month more than two hours before the sun, and will soon be easily visible in the morning sky.

Saturn rises on the 1st at 5 h. 4 m. A. M. On the 30th, he rises at 3 h. 37 m. A. M. His diameter on the 1st is 15″.2, and he is in the constellation Leo.

NEPTUNE

is morning star. He rises on the 1st at 10 h. 17 m. P. M. On the 30th, he rises at 8 h. 24 m. P. M. His diameter on the 1st is 2″.6, and he is in the constellation Taurus.

Uranus, Venus, Mars, and Jupiter are evening stars at the close of the month, Mercury, Saturn, and Neptune are morning stars.

JOHN ERICSSON.

In another column will be found an account of the imposing ceremonial which took place in this city on the 23d inst., on the occasion of the transfer of the remains of this distinguished man from the cemetery to the war ship Baltimore, for removal to Sweden, the native land of the deceased. He was born July 31, 1803, and died March 8, 1889, aged almost 86 years. Wermland, among the Swedish iron mountains, was the locality of his birth, and his father was a mining proprietor. As a lad, John Ericsson was distinguished for mechanical talent and facility in drawing. At 17 he was a lieutenant in the Swedish army. At the age of 23 he was in London, where he soon after planned the locomotive Novelty, which competed for the prize offered by the Liverpool and Manchester Railway Company. Stephenson's machine, the Rocket, took the prize, being twice the weight of the Novelty and better fulfilling the conditions. But the Novelty could beat all creation in speed, as she made fifty miles an hour, though weighing less than four tons. Ericsson was thus identified with the birth of the locomotive, and he astonished the world with the marvelous velocity of his machine.

Soon after this Ericsson produced plans for screw propellers for vessels and demonstrated their practicability in the form of a small tug on the Thames, by which great ships were easily towed, to the wonderment of all beholders. The British Admiralty refused to allow the Ericsson screw to be put in any war vessel, being fearful that ships could not be steered if such a thing were in the stern. Some Americans, however, gave him encouragement to come to the United States, which he did in 1839, and here, in conjunction with Robert F. Stockton, he designed the screw and machinery for the war ship Princeton, in which for the first time all the mechanism for propulsion was arranged below the water line.

In a recent number of the *Army and Navy Journal*, Mr. William C. Church, the appointed biographer of the late Captain Ericsson, speaks of him and some of his achievements and their results as follows:

"We honor ourselves in offering some small meed of recognition to the man who has done so much for the world; whose whole soul was absorbed in the one great thought as to how he might make himself most useful to his fellows. There were but two articles in Ericsson's simple creed: one was the unfailing belief in the wisdom and the providence of the Great Mechanician,' as he called Him whose laws of motion and of

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force it was his mission to study and apply; the other, that the Creator had bestowed upon him unusual capacity for this particular work, and that it was his duty to exert his powers to the very utmost to accomplish all he could within the span of his life.

"It is susceptible of the clearest demonstration that our great navies of to-day, mercantile and national, are the result of ideas that Ericsson introduced into navigation half a century or more ago—introduced in the face of opposition and ridicule so universal and uncompromising that the wonder is that even his sturdy strength was sufficient to overcome them. As he has himself said, the opposition he encountered, simply because he knew more than others on the subject under discussion, brought many hours of unhappiness to a life otherwise prosperous and contented.

"What he has done for the country is only partially known, and the appreciation of it will grow with time. Nothing is more utterly absurd, to one who knows the facts, than the charge of plagiarism brought against him in connection with the Monitor. His studies and his experiences for nearly forty years led progressively up to the result at Hampton Roads, and what has followed it. Consider, first, his youthful inquiries into the principles of stability in floating structures, prompted by observing the movements of rafts upon the Swedish lakes; next his application in 1828 to Sir John Ross's Arctic steamer Victory of the principle of under-water propulsion; then his application of vertical engines to the screw in 1837, and the combination of the two principles, with coal armor and other features added, in the Princeton of 1843; finally his studies in 1846, in answer to a call from Congress, into the subject of making iron war ships shot proof, and his positive conclusion that this was impossible in the case of an ordinary naval vessel.

"The Monitor grew as naturally out of these and kindred studies, and the conclusions of a lifetime, as the fruit out of the flower. Ericsson was no more indebted to Quimby, *et id genus omne*, for the Monitor than were Grant, Sherman, and Sheridan for their success upon the battlefields of the rebellion to the gentlemen who so ably discussed military matters about that time in the journals of the day.

"That we owe the screw propeller and the great commercial and naval changes that follow it to John Ericsson is beyond question. John Bourne, whose investigations have taken shape in a bulky volume, describing over one hundred attempts at a screw, gives the credit for its first practical application to John Ericsson. Not only did he make it a success, but he successfuly applied it to sixty different vessels navigating the waters before any other screw went beyond the stage of experiment. He built the first screw naval vessel, the U. S. ss. Princeton. He designed, in New York, the engines of the first successful British screw vessel, the Amphion, and through his agent, Von Rosen, he introduced the screw into the French navy. Not only does Bourne give to Ericsson the honor of the screw, but so does Bennett Woodcroft, of the British patent office, himself the designer of a screw, and author of a work upon the history of the propeller, and Scott Russell, also. The 'Encyclopædia Britannica' truthfully declares that 'while others made various tentative efforts after the screw, a small vessel fitted with a propeller, patented by Ericsson, was the *first* brought into practical use.' Those who deny these claims speak from ignorance or prejudice, and not from knowledge.

"Even in ordnance Ericsson was a master, and in sworn testimony before the congressional committee on the conduct of the war both Parrott and Dahlgren distinctly declared that they dated their successful studies in ordnance from John Ericsson's Princeton. He brought with him from England in 1839 a reinforced 12 in. gun, which is now, in 1890, in good shape at the Brooklyn Navy Yard, after being subjected to the most crucial tests with heavy charges. He anticipated the present idea of determining distances at sea with an automatically registering distance instrument, which was perfectly practicable. It was introduced into the Princeton, and was awarded a prize at the London exposition of 1851, after a trial of eight years.

"The compressor gear for handling heavy guns, and one contrivance after another, introduced into the various vessels, we owe to his genius. When we come to minor details the list is endless. He had enormous capacity, endless industry, unbounded fertility of invention, and his life was prolonged through a working career extending over full seventy years."

STENCIL INK.—Use shellac 2 oz., borax 2 oz., water 25 oz., gum arabic 2 oz. Color with fine lampblack, to desired consistency. You may use turpentine and lampblack with a little linseed oil, or even glue and water with lampblack.

Removal of Ericsson's Remains to Sweden.

On the 23d inst. the city of New York was the scene of a most imposing and remarkable ceremonial, the occasion being the removal from the city cemetery to the transporting war ship of the earthly remains of John Ericsson, the distinguished inventor and engineer. The people of his native country with one voice entreated that his ashes might be allowed to repose with those of his ancestors in the soil of Sweden, his beloved native land. His American executors could not refuse compliance with the request of the Swedish nation, and the government of the United States, in token of the profound reverence in which his memory is held by the American people, selected its largest and finest available ship of war—the Baltimore—to convey the remains of the honored dead to the Swedish shores.

The exercises attending the transfer of the body from the city cemetery to the man-of-war in the harbor were attended with all the pomp and circumstance of a great public demonstration. The body had been embalmed, and on its removal from the receiving vault was found to be in a perfect state of preservation, the features like those of life. The coffin was then placed in a zinc box, hermetically sealed, and this again was placed in a large box of polished oak, which was then draped with the national colors of Sweden and the original American flag that floated over the Monitor in its fight with the Merrimac in 1862.

The Scandinavian singing societies of New York now

CAPTAIN JOHN ERICSSON.

grouped themselves with bared heads around the bier and sang Otto Lindsblad's "Stridsbaen," or the war prayer of Sweden. Then sailors of the American navy bore the remains to a hearse drawn by four black horses, covered with heavy black funereal trappings, the bells of the neighboring churches began to toll, the drums rolled, the military fell into line, and at one o'clock p. m. the great procession, consisting of citizens, societies, and officials, including the Secretary of the Navy, Rear Admiral Worden, the first commander of the Monitor, Major-General Howard, of the army, the Mayor of New York City, and many others, began to move to the funeral dirges of many bands. Among the societies that assembled to do homage to the distinguished dead were the Amaranthus and Manhem Lodges of Odd Fellows; the American Society of Swedish Engineers; the American Society of Civil Engineers; the American Society of Mechanical Engineers; the Marine Society of the City of New York; the Swedish division; the Norwegian-American Seamen's Association; the Farragut Naval Veterans' Association, G. A. R.; Naval Post, No. 516, G. A. R.; Stevens Naval Post, of Hoboken, G. A. R.; Rankin Post, No. 10, G. A. R.; William Lloyd Garrison Post, No. 207, G. A. R.; workmen of the Delamater Iron Works; the Osbon Cadets; several lodges of Odd Fellows.

The route of the procession was down the great thoroughfare of Broadway to the Battery, at the extreme southern end of the city. The buildings along the route of the procession were appropriately draped, and the windows, doorsteps, house tops and pavements were thronged with spectators. Flags were at half mast on public and private buildings, and the Swedish colors of blue and orange were everywhere displayed. It was a solemn and impressive spectacle. The number of persons in line is estimated at over 6,000. The Swedish division, composed of members of various societies, formed an important portion.

When the procession reached the Battery, the waters of the bay were covered with steamers crowded with people. A fleet of national war ships lay extended in a long line, which reached from Bedlow's Island almost to Robins Reef. The flags of three admirals flew from three different flagships anchored in the line. First came the Dolphin flying the blue flag of Admiral Gherardi. The Petrel and Kearsarge were next in line. Then came the Pensacola with the red flag of Admiral McCann flying, and after the Enterprise. The Atlanta and Yorktown were next, and then the Chicago with the flag of Admiral Walker.

Just above Bedlow's Island was anchored the Baltimore, above her the Despatch, and still further upstream was the monitor Nantucket, one of the original monitors, which did service in the war. Here and there graceful steam yachts were moving about, and off Pier A lay a flotilla of more than thirty pulling boats and steam launches from the men-of-war. Everywhere on land and sea, on houses, forts and fleet, flags were at half mast.

The coffin was carried on board the Nina, the band playing the Swedish naitonal anthem, when, with minute guns sounding from the monitor Nantucket; with two long lines of pulling boats and steam launches on either side, and attended by a great fleet of steamers bearing thousands of spectators, the body of the lamented Ericsson was borne to the side of the Baltimore, raised upon her yard arms, and deposited on her deck. Mr. C. H. Robinson, one of the executors of the Ericsson estate, in a few appropriate words, committed the remains to the care of Capt. Schley, of the Baltimore, to which the captain replied, accepting the solemn duty.

A little time elapsed and then the white and blue royal naval ensign of Norway and Sweden was run up to the fore of the Baltimore, and she steamed slowly down the line of war vessels and began her voyage to Sweden. As soon as she got under way the guns of Castle William began a national salute, and as she passed down the line of war vessels, each hoisted the naval ensign of Sweden and Norway at the fore and saluted with twenty-one guns. Fort Hamilton and Fort Wadsworth, at the Narrows, also saluted the Baltimore as she passed out to the open sea.

THE PHOTOGRAPHERS' CONVENTION—A MEMORIAL TO DAGUERRE.

The eleventh annual convention of the Photographer's Association of America was held between August 12 and 15, in the National Museum, connected with the Smithsonian Institution, at Washington, D. C., and terminated its session by presenting to the United States a memorial to Daguerre, the discoverer of photography, which has been placed in the center hall or rotunda of the large building. It was unveiled on the 15th inst., by Mr. J. W. Noble, the Secretary of the Interior, who accepted it for the government.

The memorial was designed by the sculptor, Mr. J. Schuyler Hartley, of New York. It consists of a massive granite base, supporting a granite globe, the whole standing sixteen feet high. The design in bronze represents a figure, "Fame," with partial bended knee in a reverential posture, placing the bronze medallion bust of Daguerre, as if it were a picture encircled with a wreath of laurel, at the foot of the globe; the ends of the wreath are carried over the globe and hang gracefully down on one side.

The design is intended to show how universal Daguerre's discovery has become. The bronze figure is 8 ft. 4 in. high, and the medallion bust of Daguerre is one and a half times life size. The bust was modeled from a daguerreotype of Daguerre himself.

On the base of the pedestal are inscribed the words "Photography, steam, and electricity, the three greatest discoveries of the last half century." The cost of the memorial is $6,000.

PRESERVALINE is the name of a preparation sold to milk dealers to enable them, by adding it to their milk, to palm off stale milk on the community. It is supposed to consist mainly of boric or of salicylic acid. Ten per cent of the milk furnished to Brooklyn is said to have had this substance added to it. The persons concerned profess that the milk is not made injurious by this procedure, but it is very obvious that it may become injurious under certain circumstances, and the State Dairy Commission is quite right in declining to leave that question to the milkmen's discretion.—*N. Y. Med. Jour.*

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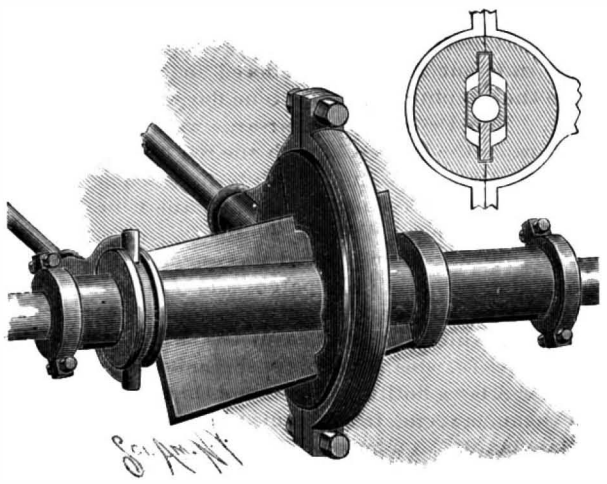
AN IMPROVED SHIFTING ECCENTRIC.

The illustration represents a device adapted for cutting off at any desired point, or for stopping and reversing the motion of the machine whenever desired. It consists of a disk held to slide across the main shaft, with inclines mounted to slide and pass centrally through the disk, the inclines turning with the main



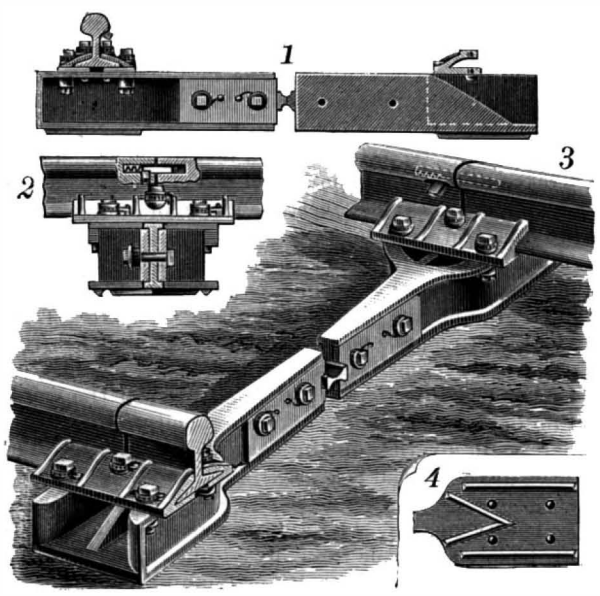
BRANCH'S SHIFTING ECCENTRIC.

shaft. A sleeve, preferably made in two parts, is secured by end clamps on the main shaft, and a portion of the central part of this sleeve has flat sides, as shown in the sectional view, on which fits a disk having an elongated opening with curved ends, so that when the sleeve is turned the disk is turned also, while at the same time free to slide across the sleeve. On the disk is held, in the usual way, an eccentric strap connected with the slide valve of the machine. In the two sections of the sleeve are opposite longitudinal grooves in which slide inclines, secured at one end to a collar sliding on the sleeve, and at their other ends to a flanged collar connected with a shifting lever, whereby the inclines may be moved backward and forward in the opposite grooves of the sleeve. The inclines also fit into opposite recesses in the disk, in the top and bottom of the elongated opening. When the eccentric is in the position shown in the sectional view, no eccentric motion takes place, and the valve is at a standstill; but by shifting the flanged collar to one side, the inclines cause the disk to slide into an eccentric position relative to the main shaft, so that a backward and forward motion is imparted to the valve, the extent of which can be so regulated that the steam or other motive will be cut off at any desired point.

For further information relative to this invention address Mrs. Emma L. Branch (administratrix of Jesse M. Branch, the inventor, deceased), Lawrence, Mich.

AN IMPROVED RAILROAD TIE.

The illustration represents a strong and durable tie, with means for attaching the rails thereto, which has been patented by Mr. John M. Fellows, of Burlington, Ind. Fig. 1 shows a longitudinal view, and Fig. 2 a cross section of the tie with rail attached, the latter view being partly broken away, Fig. 4 being a bottom view of one end of the tie, showing its strengthening ribs, while Fig. 3 illustrates the entire device in perspective. The tie may be of wood or metal, preferably of the latter, and has two similar end portions with inwardly extending shanks, united near the center by a spring, to permit of the tie bending without breaking. The ends of the tie are widened or forked, and have



FELLOWS' RAILROAD TIE.

flanges on their upper portion on which rest the chairs, the flanges having holes by means of which the chairs are bolted and pinned thereto. The chairs also have suitable holes for these bolts, and depending pins to fit in corresponding holes in the flanges, to assist in holding the chairs in position, the rails resting and being firmly held in a longitudinal recess of the chair adapted to fit the flanges of the rails. The abutting ends of the rails have each a longitudinal recess in which fits a dowel pin, so that the ends of the rails will always be in line; and in the rear of the dowel pin, in a recess of one of the rails, is a spiral spring pressing the end of the pin, permitting the rail to contract or expand under the influence of heat or cold. The dowel pin has a removable arm extending through a slot to the outside of the rail, by means of which the pin may be drawn back into the rail when a joint is to be made. The bolts used are peculiar in that they have a ratchet wheel just below the head, and when turned to position are held by a pawl attached to the part to which the bolt is applied adjacent to the bolt.

Grouping Trees.

It is one thing to plant, and almost any one may in some way accomplish the task; but it is another thing to plant effectively, for it needs a true artist to do this successfully. A wide range of acquaintance with the aspects, habits, and dimensions of plants, their development of special features, times of flowering, alternation of tint, the positions best suited to bring out their beauties or to be beautified by them, are all matters of importance, and calculated to tax the skill and taste of the most experienced and accomplished. Grouping is a department of ornamental planting at once the most effective and the most difficult. There is a wide difference between a group and a clump. A clump is usually a mass of planting, formal and monotonous in aspect; whereas a group should present an infinite variety of form and outline, all the material of which it is composed retaining a certain amount of individuality, and yet blending in happy and graceful unison, free from trim formality, as also from absurd incongruity; and he who would accomplish the art of thus planting cannot do better than become an earnest student of nature herself.

As a rule, groups should be bold and dense; anything like thinness has a mean and poverty-stricken aspect, which should be carefully avoided. The outlines of groups, both on the ground and against the sky, should be carefully designed; the ground lines should be easy and flowing, free from false curves and anything approaching to rigidity; the sky line widely diversified, but ever harmonious—here rendered striking by the upshooting of some plant of distinct character, anon merging easily and naturally into lines of smoothness, graceful as those of nature herself. Thus will be secured those exquisite effects of light and shade so full of charm and beauty to the eye capable of their appreciation. These features are of the greatest importance in the immediate vicinity of water, where shadows and reflections are ever changing and ever new. Again, park and other like groups should always be accompanied by a few irregularly planted trees, such as thorns, etc., especially at their salient points; this happily removes all stiffness, and gives a natural expression to the whole. The composition of groups should always be ruled by the position they occupy. On the lawn the plants employed should be rich and elegant; in the park or on the hillside, noble and majestic; near water, partially pendulous; and not only so, but the general aspect of the locality and the style of house should also be taken into account, as certain trees are more in unison with wild, and others with sylvan scenery. It is also usually laid down as a rule that pyramidal forms harmonize best with Grecian and round-headed forms best with Gothic styles of architecture. This rule, however, must be understood as of general rather than minute application, or a most unnatural and monotonous effect will be the result. Groups may be composed of one or more species or varieties, and if carefully executed, with equally good results. As a rule, the plants should differ in size, in order that the outline may be more varied; if the group be of irregular form, the largest plants should be placed in its center and salient curves; it will thus gain in dignity, and be far more natural and pleasing than if faced by a stiff gradation. Mixed groups should be composed of such trees as harmonize or contrast well with each other.—*The Garden.*

161,397 Miles of Railway.

Poor's Manual says at the close of 1889 there were, in this country, 161,397 miles of track, of which 5,751 were laid during the year. The gross earnings for the year were a trifle over one billion dollars, and the net earnings nearly one-third of a billion—$318,125,339.

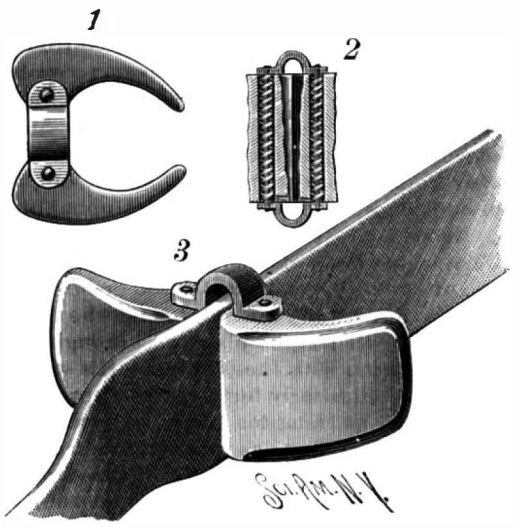
It costs, on an average, 2·17 cents to carry a passenger one mile in the United States, and the average length of his trip is 24·17 miles. About half a billion passengers were carried.

Over 600,000,000 tons of freight were handled during the year. The cost of moving one ton one mile, on the average, has been brought down to 0·97½ cent, while for some of the great trunk lines the rate is much lower.

The total investment, measured by share capital, funded and unfunded debts, in American railways is $9,680,942,249, on which last year's gross earnings were 10·4 per cent, and net earnings 3·3 per cent.

AN IMPROVED REIN GRIP.

The accompanying illustration represents a small, neat device, to be located on the driving reins or a riding bridle, to afford an adjustable abutment whereby a firm grip upon the reins may be assured at all times. It has been patented by Elvin L. Smith, of Mansfield,



SMITH'S REIN GRIP.

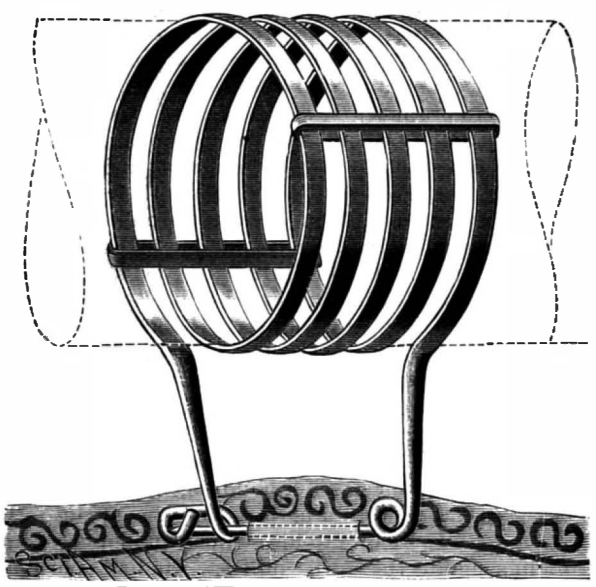
Mass. The device consists of two similarly shaped cam blocks with curved wings, held oppositely by bracket plates, as shown in Figs. 1 and 3. The plates are held spaced apart by parallel rods whose ends are secured in the flanges of the bracket plates, and upon these rods the cam blocks are mounted, a spiral spring being introduced around the rods, as shown in Fig. 2. One end of each spring is fastened to the flange of the bracket plate, and the other end is interlocked with the cam block, in such a manner that their strength will be exerted to extend the wings oppositely, and cause the cams to bind upon a rein passed between them. When in use, the fingers abut against the lateral wings, giving a firm hold, but by a slight pressure upon the free ends of the wings they may be instantly folded into the position shown in Fig. 1, when the grip is released from the rein. The grip may be made to embrace two lines as well as one, or a grip may be applied to each rein where a team hard to control is to be driven.

A Large Tree.

The *Victoria Colonist* says: "Among a boom of logs at Leamy & Kyle's mill, on False Creek, Vancouver, is a tree cut into four 24 foot logs taken from one tree, which is one of the largest specimens of the Douglas fir that has ever been cut in this province, whose record for giants of the forest is world-wide. These four logs were respectively 84 inches, 76 inches, 70 inches, and 60 inches, and in none of them was there a knot or other defect. The total number of feet of lumber that can be cut out of this tree is 28,614."

AN IMPROVED CURTAIN-POLE RING AND PIN.

An improvement in rings and pins for suspending curtains, portieres, lambrequins, and other draperies from horizontal poles, is shown in the illustration, and has been patented by Mr. Leopold Weidenfeld, of Broken Bow, Neb. The part which encircles the pole is made of spring metal in the form of a helix, the two end portions thereof projecting downwardly. One of these ends is turned up to form a clasp, and the lower part of the other end is bent to form a coil to give sufficient spring to the end, which is formed into a pin



WEIDENFELD'S CURTAIN-POLE RING AND PIN.

adapted to be retained by the clasp. The helical portion of the device is clasped by one or two flattened rings or bands, to prevent it from spreading and allow the pin to be released from the clasp. The pin is designed to be passed through a fabric to be suspended, as shown in the illustration, and is long enough to take firm hold thereof, so that it will not be easily torn away.

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Transplanting Large Trees.

The superintendent of a cemetery in Chicago gives an account, in *Garden and Forest*, of the removal of two trees, one of which was sixty feet high and more than two feet in diameter. They were removed in an upright position on rollers, with the aid of a heavy framework of timber. A part of the earth was retained on the roots. The cost was between five and six hundred dollars. It is pronounced too early yet to speak with confidence of the result. There is no probability, however, that the original vigor of the trees will be imparted to these monsters after removal. A tree sixty feet high has a circle of roots at least one hundred and twenty feet in diameter, and an old tree will not easily recover from the loss of most of them, as in a younger tree. We noticed this mode, or a similar one, in use at Chicago, in a former volume of the *Country Gentleman*.

The practice of removing very large trees has never been successful. In the experiments made many years ago on a liberal scale in the moist climate of Scotland, although the large trees survived the operation, they never recovered their luxuriance, but remained feeble and sickly. We have seen trees removed when eight inches in diameter without ever recovering from the operation. But much depends on preparing them beforehand by shortening the roots, and there would of course be much difference between giving a copious supply of carefully taken up roots, or only a scant quantity of badly mutilated ones.

As a general rule and for common planting, it is not advisable to attempt the removal of trees over an inch and a half in diameter. But with a previous preparation by one or more transplantings, it will not be difficult to remove those which are three inches. Occasionally it becomes desirable to secure by transplanting those which may be four or five inches. Evergreens especially may be required to be transplanted to new grounds. The practice of attempting the work on very large trees, or two feet or more in diameter, as in the Chicago experiment, is not to be recommended in any case. The same outlay of five hundred dollars under the direction of skill, with smaller trees, would accomplish many times more in landscape effect and in sylvan ornament.—*Country Gentleman*.

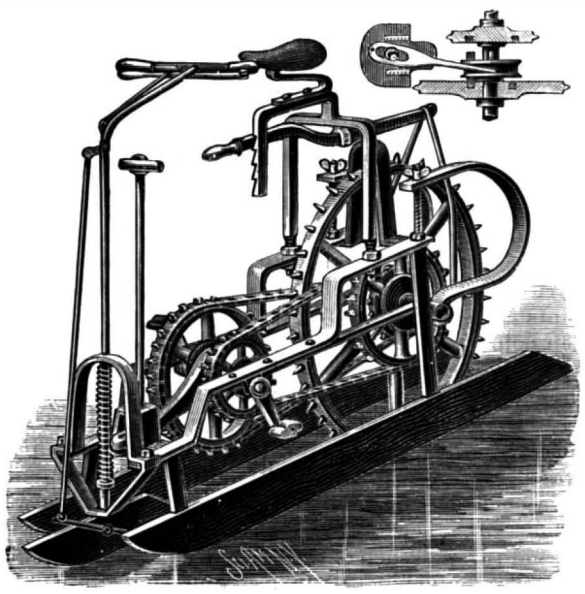
AN IMPROVED FOLDING UMBRELLA.

The accompanying illustration represents an umbrella which can be readily folded up when not in use (as shown in Figs. 1 and 3) for conveniently carrying it in a pocket, valise, or other suitable receptacle. The cane of the umbrella is made in three telescoping sections, of which the lower or handle section serves to push the upper section out of the middle section, suitable catches being provided for holding the several sections in an extended position when the umbrella is used, as illustrated in Fig. 2. On the upper or outermost section is secured the crown piece, to which are pivoted the ribs, each made in two parts connected with each other by a joint plate, shown in detail in Fig. 4, so that one rib part can fold on to the other, as shown in Fig. 1, thereby permitting a close folding of the umbrella. The ribs are pivotally connected by braces with a brace piece, which is fastened on or near the upper end of the middle section. The joint plates of the ribs are so constructed that when the umbrella is opened the rib parts are prevented from bending outward, and an accidental closing or folding of the rib parts cannot take place. At or near the joints of the ribs, at the inside of the covering material, is arranged a flexible cord or braid connecting the several ribs with each other and serving to prevent the covering material from becoming entangled in the joints of the ribs when the umbrella is closed. The umbrella can be readily extended by the operator pulling out the handle section of the cane to engage with its upper end the spring catch (shown in Fig. 5) of the uppermost cane section; by then pushing the handle section inward the upper cane section is pushed out of the middle section, which latter is held with the left hand of the operator, the right hand being used to manipulate the several parts. A spring catch locks the outermost cane section, when extended, to the middle cane section. The handle section is then again moved outward until it automatically locks itself to the middle section by a spring catch, shown in Fig. 2. At the time the outermost cane section slides outward the braces swing upward and outward, thus moving the ribs and the covering material into their proper places. The folding of the umbrella is readily accomplished by unlocking the spring catches and telescoping the cane sections, whereby the braces and ribs, with the covering material, fold up into the position shown in Fig. 1. The folded umbrella takes up very little room, and may be placed in an additional casing of a suitable fabric, as illustrated in Fig. 3. This invention has been patented and is manufactured by Mr. John Bergesen, 250 Wyckoff Street, Brooklyn, N. Y.

BERGESEN'S FOLDING UMBRELLA.

AN IMPROVED SLED PROPELLER.

A device to facilitate the propulsion of a sled over ice or hard snow, and by which different rates of speed may be maintained, is illustrated herewith, and has been patented by Mr. John Stanford, of Chester, Lunenburg County, Nova Scotia, Canada. The main runners are held spaced apart by front and rear yoke frames, the latter frame having an upwardly extending contracted portion over the propelling wheel, which is centrally mounted between the runners upon a short transverse shaft, the wheel having suitable teeth or spikes in its periphery to insure a strong hold on the ice or snow. The bearings of the propelling wheel shaft are in the lower portion of rearwardly and



STANFORD'S SLED PROPELLER.

upwardly curved spring bars, the upper terminals of which are held on standing screw-threaded bolts extending upward from side bars of the frame, whereby, by means of winged nuts, a regulated pressure may be held upon the spring bar ends to cause the propelling wheel to bite more or less upon the ice. Directly forward of the standing bolts is mounted an arched seat support, the uprights of which are adjustable for height, the base plate for the seat spring receiving a rider's saddle, and being bent downwardly in front to provide a depending notched locking bar. To the rear surface of the seat standard is secured a bifurcated bracket arm in which is pivoted a lever having a rearward connection with a pendent link loop, the outwardly inclined limbs of which at their lower ends have a hooked engagement with the spring bars near the journal supports of the propelling wheel, while the forward end of the lever terminates in a handle within easy reach of the rider. By depressing this lever, and interlocking it with one of the notches of the locking bar, the spring bars and the propelling wheel will be raised, and the wheel may thus be removed from contact with the ice or road bed. On the treadle shaft, which is located at a convenient distance in advance of the propelling wheel, are two sprocket wheels of different sizes, connected by proper chains with wheels on the shaft of the propelling wheel, to afford a change of speed without any acceleration of treadle movement, and a clutch and clutch-shifting mechanism are provided whereby such changes of speed may be readily effected. The steering mechanism consists of a forward intermediate runner secured to a vertical steering rod, bent rearwardly and terminating in a handle within easy reach of the rider, a spiral spring on the rod holding the steering runner in yielding contact with the road bed. To check the speed of the sled a brake is provided consisting of a loop-shaped bar, pivoted to the steering runner, and its limbs loosely embracing the sides thereof, while its forward ends are engaged by an upright rod extending to one arm of a bell crank, the other arm of which is pivoted to a horizontal connecting bar, loosely secured at its opposite end to a brake lever hinge-jointed by one end to the handle bar of the steering rod. A movement of the free end of this lever toward the handle bar depresses the pointed ends of the brake bar limbs and causes them to engage the road bed to impede the forward motion of the sled.

A Cyclone at Wilkesbarre, Pa.

On the afternoon of the 19th of August this thriving city was visited by a whirlwind, which resulted in sad loss of life and destruction of valuable property.

One of the most painful scenes was at the Hazard wire rope works. The cyclone struck the rear of the large brick building. About two hundred men are employed in the works. The roof and side walls were crushed in. The bricks and ponderous machinery were scattered all over. When the storm was imminent the men rushed for the door, but many of them were caught in the ruins. As soon as the calm succeeded the cyclone, men rushed into the ruins and rescued the injured. One by one they were dragged out from under the debris. The number seriously injured at these works exceeds twelve, and there were two killed.

St. Mary's Catholic Church, in South Washington Street, is a total wreck, as is also St. Mary's parochial school, brick, on Canal Street, opposite the church. Father McAndrew's parochial residence was considerably damaged. The solid tin roof on St. Mary's convent, on South Washington Street, was torn off and blown into the street, and a part of the brick wall taken away.

A car on South Washington Street was overtaken by the cyclone near the Catholic church. In the midst of the terror a large tree fell on the roof, and the passengers gave themselves up for lost.

The Barber Asphalt Company works are blown down. S. L. Brown & Co.'s mammoth business block on Market Street, containing ten wholesale stores, is among the ruins. The Murray coal breaker was partly destroyed, with heavy loss. The mammoth Hollenback breaker is a complete wreck. The fans were stopped while twenty-seven men were at work in the Hillman vein, but luckily they were able to start them immediately. It was a very narrow escape.

The number of the dead is about thirty. A careful estimate places the number of buildings demolished and partly destroyed at nearly four hundred, and some estimate that it will exceed this figure. The loss will probably reach nearly if not quite $1,000,000.

Corrosion of Zinc in Contact with Brick.

A German paper mentions the fact that, under some conditions, sheet zinc, when in direct contact with brickwork, suffers to an appreciable extent from rapid corrosion. In building the Berlin city market halls, a portion of the zinc work which rested upon brick walls was found to be deeply pitted at a number of places, particularly where the metal was close to the bricks. Chemical examination of these resulted in showing that they contained as high as 1·14 per cent of soluble salts, of which the destructive effect increases by moisture. The proportion of such salts varies with different kinds of brick, while in some there may be nothing to induce any such corrosion. As a preventive, roofing felt or similar material may be placed between the zinc and brickwork.

Guimbobo.

The Belgian legation at Mexico has recently reported to the Belgian government on the subject of *guimbobo*, known also as *angu*, which is found in the State of Vera Cruz, a plant which should be included in the category of all the varieties of Mexican textiles. The *guimbobo* or *angu* produces not only a fiber of very superior quality, but can be easily and cheaply cultivated; moreover, the fruit of the plant constitutes a nutritious food. It appears from experiments that have already been made that the *guimbobo* differs essentially from the ramie, cotton, and hemp, as in the *guimbobo* the covering of the plant surrounds the fiber, and is not mixed up and interlaced with it; this constitutes a decided economy, added to great facility in extraction and utilization. The structure of the plant permits of the operations of separating and removing the bark being performed by machinery, while in the other fibrous plants these operations are difficult, at the same time very costly, and only possible in countries where there is a large number of hands available and cheap. The fiber of the *guimbobo* has a luster similar to that of silk, and is undoubtedly finer and stronger, with a creamy color between white and straw color.

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THE CENSUS OF THE UNITED STATES.

The census bureau of the United States for taking the general census is now busily engaged in reducing the schedules furnished by the fifty thousand enumerators, and in tabulating the results of the work done at the beginning of the present summer. The scope of the original census of former times has been amplified so as to include many particulars, and the work of recording the results is correspondingly increased. Calculating and tabulating machinery has been brought into use to shorten the time expended in reaching the conclusion. With this aid the work is progressing with exceeding rapidity. In the mere summation of results or enumeration in gross a single operator can dispose of 50,000 names in a day. Were this all that is required, the work would be completed now. But each schedule contains many particulars, as regards country of birth, age, health data, etc. Each of these headings again subdivides into a large number. Thus, under country of birth all the countries of the world are included, and under health there is a numerous list of diseases to be tabulated. This has led to a division of the office work as regard such particulars, and special tabulations are made for a number of classes.

Our readers are necessarily familiar with the work of the census enumerator. This work is entered on blank schedules, which he fills in with names and other data. The schedules from the enumerators from all parts of the United States were transmitted to Washington by registered mail. Even in the packing a regular system was followed. The blanks which had been filled up were laid one upon the other on a piece of straw board. Each pile contained the schedules of a single enumerator. On top of all was placed an empty portfolio, to whose center was pasted the label with the enumerator's name and the designation of his district upon it. The bundle was then corded together and a number of such bundles, representing from 13 to 15 enumeration districts, were placed together in a box which they exactly fitted. The box, 27 inches long and about 18 inches in its other dimensions, properly closed and sealed, was sent in this shape to the Washington office. One hundred such boxes were received daily, and several trucks were kept busy transferring them.

The first operation was the enumeration in gross of the population of the United States, and by the same operation the enumeration of families and of their size. We illustrate the machine on which this work was done. It comprises a key board with a number of keys, numbered from 1 to 20, and upon the face of the machine in front of the operator, 21 dials. The keys work the indexes on the dials by electricity. Three tabulations were made here, one the gross number of people in the United States, another the number of families, and finally the number of families of each number of individuals from 1 to 20. Having a schedule at hand, the operator we may assume sees in it a family of six members; he strikes upon the key number 6. This causes the hands on two of the dials to move. The hand on dial No. 6 moves forward one, indicating that there is one family of 6 members. The hand on the odd dial moves forward 6 divisions, indicating that there are 6 individuals to be accounted for from the schedule in question. As each contact is made a bell rings. In this way the enumeration of families up to 20 members is conducted. The few families exceeding this are not provided for on the machine, and are so rare that they may, of course, be specially noted. Great dexterity is attained in the use of this machine. It is on this that many operators attain the speed of 50,000 names per day, and the entire count of the United States has now been twice executed on machines of this type, making a total of 64,000,000 of individuals each time.

The next operation involves a classifying of the large number of data contained on the schedules. This work is done by a system of machinery involving the use of perforated cards recalling the lace pattern cards used on lace machines. For ages, race, and all other data, such as diseases or other particulars, a card is punched for each person on the schedules. The apparatus used we illustrate, together with a representation of the punched card. In front of the operator is a perforated plate, each of whose perforations has a designation marked at its side.

As samples of designations, we find one set marked with numerals running from 0 to 100, with intervals of five between. These are used to designate age. On another portion of the board the 18 divisions of the earth as adopted for the uses of the census are given for the purpose of tabulating nationalities. The same system is carried out to cover all the cases that may be named upon the schedule. The range and capacity of the machine may be realized from the fact that there are 240 of these apertures. A punch attached to a species of pantograph frame works above this plate. Back of the perforated plate is a place for the insertion of a card, and above the card and attached to the pantograph frame is a second punch. Thus connected to the frame, the second punch reproduces all the movements of the first punch in duplicate on a smaller scale and within the area of the card. When the first punch nearest the operator is forced down into any hole of the perforated plate, the punch over the card is forced down through the card, making a corresponding aperture. While it is perfectly obvious that 240 such apertures might be made on a single card, it is equally clear that this never could be required. Thus a person would only be referred to one race, and only a single age number could be tabulated, the same holding for other data, so that as carried out about 18 or 20 perforations are made in each card.

On the upper corner of the cut will be seen the picture of a perforated card. A skilled operator can read off one of these cards as if it were a book. It tells him if the person referred to is white or black; it tells the age, where born, if literate or illiterate, etc. But as this degree of skill is not to be expected from every one, templates are provided in which the perforated card can be laid, and the results read through the apertures. In their regular use such reading is unnecessary. The cards are used for tabulating results automatically. The apparatus used for that purpose we also illustrate.

A frame holding a number of depending points corresponding with a certain number only of the 240 possible apertures of a single card is arranged so as to be raised or lowered by a handle. When depressed, the points come in contact with mercury cups, one below each point, making electric contact, and each thereby causes the movement of the index of a specific dial. Thus, when depressed, each of the indexes corresponding to the contact points in use would move forward one division. If, before pressing the handle, an unperforated card were introduced, none of the contacts could be made, and none of the indexes would move. If, however, a perforated card is introduced, wires will descend through such of the perforations as correspond with the contact points in use, and contacts will be made corresponding to the perforations in the card, and the indexes corresponding thereto will move forward one division. Thus a single depression of the handle, the card being placed, causes its story to be transmitted in whole or in part to the case of dials seen facing the operator. It would be manifestly impracticable to make a single machine of sufficient capacity to include all the tabulations possible. It is here that the specializing system comes into play. A tabulating machine may be, and in practice is always, restricted by the omission of a portion of the contact points to a narrow range of subjects.

As in use at the census bureau, the machine has forty dials, and at most only forty data can be provided for on each. A box divided into compartments may be noticed at the side of the operator. This has lids to its many compartments, which are opened by electricity. As the operator presses the handle, one of the electrical connections, it may be that referring to race or any other desired particular, causes a special compartment of the box to open for the reception of the card just tabulated. Thus the cards are classified for transmission to succeeding machines.

The machines, it will be seen, go no further than to record upon dials. The results, it is obvious, may, at the close of each day, be entered in books from the dials. It will be noticed that the power of introducing or omitting contact points gives the tabulating machines a very large range. This is still further increased by the assorting case, with its twenty-six lids automatically opened or shut by certain contacts. This enables a single machine to sort out cards for as many succeeding machines as there are lids to the case. The same elasticity of function applies to the tabulating of the special schedules. A great number of these are to be treated, and the greatest variety of requirements is embodied in the execution of the operations.

The work of this census is the first ever executed by electricity. In the mere enumeration in gross 15,000,000 schedules were twice gone over. The count proper began on July 1, and in six weeks the names were counted twice. The figure of 50,000 names per day was reached on one day by forty-three operators. One operator, a lady, reached the total of about 80,000 names. The female clerks averaged about 47,000 names, against 32,000 for the male clerks. The magnitude of the work may be inferred from the fact that some four thousand employes are engaged in tabulating results and executing the other operations of the census. It is estimated that the population of the world, if scheduled, could be counted by the United States census office in 200 days.

The early completion of the count was due to the improved appliances by which it was executed. The tabulation of results from the general and special schedules will be still more facilitated by the electric machinery. It lends itself to all modifications of data, and owing to it, it is hoped that the results will be reached and printed in half the time required for the last census. The apparatus was invented by Mr. Herman Hollerith, of Washington, D. C. To a mechanical and electrical inventor the accuracy and early completion of the census work is in great part due, illustrating an interesting alliance of the abstract and concrete.

Eau de Cologne.

The following formulæ are all said to be "the original."

I.

Oil of bergamot	150 minims
Oil of lemon	60 "
Oil of Portugal	50 "
Oil of neroli	20 "
Oil of petit-grain	10 "
Oil of lavender (Eng.)	20 "
Oil of rosemary	10 "
Oil of melissa	5 "
Finest spirit	30 oz.
Rose water	14 drachms
Orange flower water	14 "

II.

Oil of bergamot	100 minims
Oil of lemon	50 "
Oil of Portugal	30 "
Oil of petit-grain	10 "
Oil of lavender	20 "
Oil of rosemary	15 "
Finest spirit	30 oz.
Rose water	9 drachms
Orange flower water	9 "
Distilled water	9 "

The above formulæ are for preparing the perfume by the cold method. The proper plan is to add the oils to the spirit in the order in which they are set down, shake well, and set aside for a few days, shaking occasionally before adding the waters. After these are added, again set aside for some time, and, if not perfectly clear, filter.

III.

Oil of Portugal	180 minims
Oil of bergamot	180 "
Oil of cedrat	120 "
Oil of lemon	120 "
Oil of neroli	190 "
Oil of petit-grain	120 "
Oil of rosemary	240 "
Oil of lemon	240 "
Finest spirit	10 oz.

This formula is for the preparation of a concentrated eau de Cologne, which will bear dilution with ten times its volume of fine spirit. Dissolve the oils in the 10 oz. of spirit, and set aside for fourteen days, shaking four times a day. Then distill the mixture twice, when the result will be 10 oz. of an exceedingly strong perfume, which improves in odor the longer it is kept, and is specially suited for exportation. It is of good odor when freshly diluted with spirit, but in this case also the odor improves on keeping.

IV.

Oil of bergamot	375 minims
Oil of cedrat	60 "
Oil of lemon	60 "
Oil of lavender	30 "
Oil of Portugal	60 "
Oil of thyme	4 "
Oil of neroli	75 "
Oil of rosemary	75 "
Finest spirit	62 oz.

Mix and distill, then add to the distillate 2½ oz. of melissa water and 5 oz. orange flower water, and distill again. The product is a very fine eau de Cologne, the formula dating as far back as 1821, but the following goes even farther, viz., to 1813:

V.

Oil of neroli	10 minims
Oil of lemon	40 "
Oil of bergamot	50 "
Oil of cedrat	15 "
Oil of lavender	18 "
Oil of rosemary	10 "
Melissa water	4½ oz.
Finest spirit	30 "

Dissolve the oils in a spirit contained in a retort, giving the mixture a thorough shaking, then close the retort and keep the contents just warm for forty-eight hours, whereby perfect blending of the oils with the spirit is insured. Then place it for twenty-four hours in a cool place, after which filter it through paper until it is obtained perfectly clear. With the filtrate mix the melissa water.—*Chemist and Druggist.*

Protection of Mine Timbers from Decay.

The German government mine Altenwald, near Saarbrucken, has, since 1888, conducted a series of experiments to ascertain the most effective means to prevent from decaying the pine timbering, which is subject to great pressure in the airways. Lime, coal tar, tar and carbolineum were tried in such a manner as to enable to compare their relative protective value. The results as published in *Ztsch. f. d. Berg-, Hutten- u. Salinenwesen* show lime to be the weakest. Coal tar preserved the outside of the timber, while the core was found completely decayed. Carbolineum proved by far the best, and is now being used on all the timbering of the upcast in that mine. The mine timbers, made of wood peeled and dried, are twice painted over with the carbolineum above ground and require each, when 2·5 meters long and 0·25 meter in diameter, in the first application ⅛ kilogramme and in the second ⅛ kilogramme, so that, at a price of 34·5 pf. per 1 kilogramme, the total cost was: For material 48·3 pf. and for labor 14 pf., or altogether about $0.15.

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The American Chemical Society.

The first general meeting of the American Chemical Society was held in Newport, R. I., on August 6th and 7th. This event is one of importance in the history of American chemistry. In August, 1874, the centennial of chemistry was celebrated at Priestley's grave, in Northumberland, Pa., and for two days exercises of the most interesting character were held. These included an address on "A Century's Progress in Chemical Theory," by Dr. T. Sterry Hunt; an address on "The Century's Progress in Industrial Chemistry," by Prof. J. Laurence Smith; and one on "American Contributions to Chemistry," by Benjamin Silliman. Dr. Hunt still lives, and urged the Newport meeting, but Laurence Smith and Silliman have passed away. At that meeting "the formation of a chemical society, which should date its origin from this centennial celebration," was proposed, but, after long discussion, the movement failed of success. A few weeks later the American Association for the Advancement of Science established a sub-section of chemistry, the first meeting of the section being held in Detroit, Mich., in August, 1875.

The idea of an American chemical society, however, did not die, and two years later the American Chemical Society was organized in New York. Its first president was John W. Draper, and in succession he was followed by J. Laurence Smith, Samuel W. Johnson, T. Sterry Hunt, F. A. Genth, C. F. Chandler, John W. Mallett, James C. Booth, A. B. Prescott, C. A. Goessman, and Henry B. Nason. For a time the society flourished, new members joined, and a satisfactory journal was published, but it finally became practically a local organization, with a membership of nearly two hundred, of which perhaps one-half were non-resident members.

In consequence, other local and special societies were formed. The first of these was the Convention of Agricultural Chemists, which was organized in Washington on July 28, 1880, and out of which has grown the Association of Official Agricultural Chemists that meets annually in Washington, under the auspices of the Department of Agriculture. Its publications are issued by the government. Its objects are: (1) To secure uniformity and accuracy in the methods, results, and modes of statement of analyses of fertilizers, soils, cattle foods, dairy products, and other materials connected with agricultural industry; and (2) to afford opportunity for the discussion of matters of interest to agricultural chemists."

The Chemical Society of Washington was founded in Washington, D. C., on January 12, 1884. Its membership consists chiefly of chemists that are officially connected with the different branches of the government service. Likewise, in Philadelphia, a local organization came in existence as the Chemical Section of the Franklin Institute.

In addition to the foregoing, there is a chemical club in Chicago and a section in chemistry and physics connected with the American Academy of Arts and Sciences, in Boston.

Such was the condition of affairs in 1889, when a committee appointed at the Cleveland meeting of the American Association for the Advancement of Science met the chemical section at Toronto.

Among those who strongly urged the formation of a national organization was vice-president Professor Charles E. Munroe, of Newport, R. I., and a general meeting of chemists was called for under the auspices of the American Chemical Society at Newport, R. I.

On the morning of Wednesday, August 6, the assembled chemists were called to order by Professor Charles F. Chandler, a vice-president of the American Chemical Society, and an address of welcome was made by Colonel John Hare Powell, to which an appropriate reply was made by Professor Chandler. The following papers were then read:

On the Determination of the Strength of Various Explosives. Willoughby Walke.

On the Volumetric Composition of Water. E. W. Morley.

On Carbon as an Impurity affecting the Determination of the Atomic Weight of Hydrogen. E. W. Morley.

On a New Form of Air Thermometer for Technical Uses. A. H. Sabine.

On a New Apparatus and an Improved Method for the Estimation of Urea. E. H. Bartley.

On Resins. L. H. Friedburg.

In the afternoon the members and guests were taken in a government launch to the United States torpedo station, and made a visit to the United States naval training school.

On the following morning the society convened at 10 o'clock, and at once the discussion of a national chemical society was taken up, Professor C. F. Chandler stating that it was the desire of the American Chemical Society to do what it could toward making itself the national organization, and describing its history.

Finally, on motion by Dr. Elwyn Waller, it was decided to refer the matter "to a committee of conference consisting of three members to be appointed by the chair." This action, on which all parties were agreed, practically settled the question of an American chemical society, and it is hoped that a second conference, to be held during the coming winter (probably in Philadelphia), will find delegates from the various local bodies previously referred to, ready and willing to combine in one single national organization.

The following papers were then read:

On the Perissad Law. W. R. Livermore.

On the Relative Intensity of Chemical Action between the Atoms. L. H. Friedburg.

On Butschli's Experimental Imitation of Protoplasm. C. A. Siegfried.

Notes on Water Analysis by the Ammonia Method, with some New Apparatus. A. A. Breneman.

On the Chemical Work of the United States Geological Survey. F. W. Clarke.

On Grass Oils. F. D. Dodge.

On the Action of Nitrils on Organic Acids. C. E. Colby and F. D. Dodge.

On the Influence Method as a Test for Explosives. C. E. Munroe.

On the Use of the Gooch Crucible as a Silver Voltameter. Morris Loeb.

On the Extraction of Indigotin from Commercial Indigo. T. A. Morgan.

On the Uses of Fluorine for the Softening of Hard Water. C. A. Doremus.

In the afternoon the members of the society and their friends were entertained by a sail around Newport Bay in the launch belonging to the U. S. engineers, while a small delegation made a tour of the adjacent island of Canonicut in the torpedo boat Stiletto.

M. B.

The August Shower of Meteors.

The August meteors are believed to originate from a large cluster or zone of meteoric bodies which revolves around the sun in an elliptical orbit, extending far beyond the orbit of the remote planet Neptune, and through which the earth plunges annually. It is also believed by most astronomers that these bodies are scattered over the entire path of the cluster to which they belong, but not in equal numbers throughout. The earth is about ten days in passing through the entire cluster, which, from our velocity in space, indicates that the thickness of the cluster is about 16,000,000 miles. As the annual August display usually lasts about six hours, and the earth travels at the rate of 68,000 miles per hour, or 18 miles a second, it follows that the breadth of the meteor stream at the place where the earth crosses it, dense enough to produce a "meteoric shower," is over 400,000 miles. On August 10 each year the earth encounters the elliptical orbit of this meteoric cluster, the major axis of which is fifty times greater than the mean diameter of the earth's orbit. The orbit of the meteors is greatly inclined to that of the earth, and their motion is retrograde, or contrary to that of the earth.

The density of the meteoric cluster—or stream, as some astronomers call it—is believed to be quite small, the average distance of the members from each other having been computed to be more than 100 miles, from which circumstance and the fact, already mentioned, that the stream is spread around the entire orbit, Prof. Newcomb, of the United States Naval Observatory, recognizes decided indications of antiquity in the August meteor stream, as compared with the November cluster, "so that we can say, with considerable probability, that the August group has been in our system at least twenty times longer than the November group."

Professor Swift, in referring to the August meteoric display, says: "The first August shower mentioned in history occurred on July 25, A. D. 811, and has appeared with unfailing regularity down to our time, except a break of eighty-three years between 841 and 924, and another and much longer one of 310 years, between 933 and 1243, owing, probably, to breaks in the ring, or, which is more likely, to a failure to record them." There are on record a large number of meteoric displays that are believed to belong to the same cluster, and a comparison of the dates affords some indication of a maximum of brilliancy, recurring at intervals of about 108 years.

It is a fact not generally known that the earth passes through a little more than 100 of these meteor streams in the course of its annual journey around the sun. Each of these streams has some particular "radiant point," and belongs to a distinct system of meteors. Over 100 of these streams have had their orbits determined by astronomers, and others are frequently added to the list already known. From a long series of observations, astronomers have concluded that the earth encounters about 400,000,000 shooting stars—including those that would be seen through the largest telescopes—during its annual journey around the sun. . . . . It is now known that shooting stars are fragmentary masses, revolving, like the planets, around the sun as a center, which in their course approach the earth, and being drawn by its attraction into our atmosphere are ignited by the heat generated through friction and resistance offered by the compressed air. We never see a shooting star until it enters the atmosphere, when it is heated to incandescence—or becomes "red hot"—and its substance is scattered in powder or smoke, falls to the earth as "meteor dust," or floats about in the atmosphere.

Shooting stars are so called merely from the fact that they resemble the stars in appearance. They enter our atmosphere with a velocity from fifty to a hundred times that of a cannon ball, and previous to this they were dark and invisible, but are almost instantly ignited after their sudden impact, and entirely consumed, their dust gradually falling to the earth. A Russian astronomer has calculated that 4,950 pounds of meteoric dust fall to the earth every hour, which would make fifty-nine tons a day, or more than 21,500 tons in a year, while Professor Proctor considers even this estimate too small. "All know what a shooting star looks like, but no living man can tell us what it really is, for not one has ever been known to reach the earth." The singular fact has been demonstrated that while the most rapid cannon shots scarcely attain a velocity of 600 meters a second—over 1,500 miles an hour—meteorites are known to penetrate the atmosphere with a velocity of 40,000, or even 60,000, meters per second; and the motion of ordinary shooting stars is so extremely rapid that they are consumed and scattered in smoke before they have time to reach the earth. Professor Swift says: "A shooting star is only visible while undergoing the process of combustion, which lasts from one to three seconds, seldom longer. Only while being burned are they visible to us, as then they shine by their own light. Shooting stars move in all directions, and at velocities probably equal to the earth's—nearly nineteen miles a second. One moving retrograde therefore (from east to west) would plunge into the atmosphere at a relative velocity of some thirty-eight miles a second, and, if allowance be made for accelerated motion, caused by the earth's attraction, probably double that, or seventy-five miles a second. The encounter is fearful, and but for the atmosphere, which acts as a cushion, the effect would be disastrous, for not less than 800,000,000 would rain upon the earth every day."

The actual diameter of the largest meteor or "fire ball" is estimated by Humboldt to vary from five hundred to twenty-eight thousand feet. Others allow a diameter of about a mile. Shooting stars are much smaller, their weight varying from thirty grains to seven pounds. Professor Harkness, who has devoted many years to the study of this subject, estimates that the average weight of ordinary shooting stars does not differ much from one grain, so that the minuteness of these curious celestial objects may be easily imagined. Shooting stars are the smallest celestial bodies known to astronomers, the majority of them being no larger than a pebble, or grain of coarse sand even.

No line of demarkation can be drawn between the smallest shooting star and a brilliant meteor that leaves a luminous train behind. In fact, a "meteor" is simply a large "shooting star." They differ from each other in size, color, direction, train, and velocity, but in astronomical character they are precisely alike, both moving in long orbits like comets, and like comets at all angles to the earth's orbit. Astronomically speaking, a meteor is a small comet, not having, however, the comet's "tail."

Some meteors are so large that they fall to the earth as "aerolites" before the heat produced by friction can convert their substance into vapor. Several have been found, and seen to fall, on various parts of the earth, and a massive specimen weighing 1,635 pounds, or nearly one ton, is preserved in the museum of Yale College.—*Inter Ocean.*

Improvement in Photo-Etching.

The *Papier Zeitung*, of Berlin, announces that a discovery has just been made in etching, and especially in photogravure. As usual, the drawing is traced on a plate of zinc, either by an artist or by photography, with any suitable etching ground. This plate, backed with asphaltum, is laid in a bath of dilute acid. It is then put in circuit with a dynamo, the other pole being merely placed in the acid. When a current is allowed to pass, the acid attacks the metal with surprising rapidity. A few minutes suffice to bite the plate, and the depth of the etching can be easily controlled. It appears to us that the action is probably due to the depolarization of the surface of the metal, which in the ordinary method of etching becomes covered with a film of hydrogen, or, at all events, with a number of minute bubbles, which make the biting irregular unless the plate is incessantly rocked and brushed.

Manganese Plating of Iron as a Protection from Rust.

According to our Italian contemporary, *Progresso*, articles of iron can be protected against rust by sinking them near the negative pole of an electric bath composed of 10 liters of water, 50 grammes of chloride of manganese, and 200 grammes of nitrate of ammonia. Under the influence of the current the bath deposits on the articles a film of metallic manganese which prevents them from rusting.

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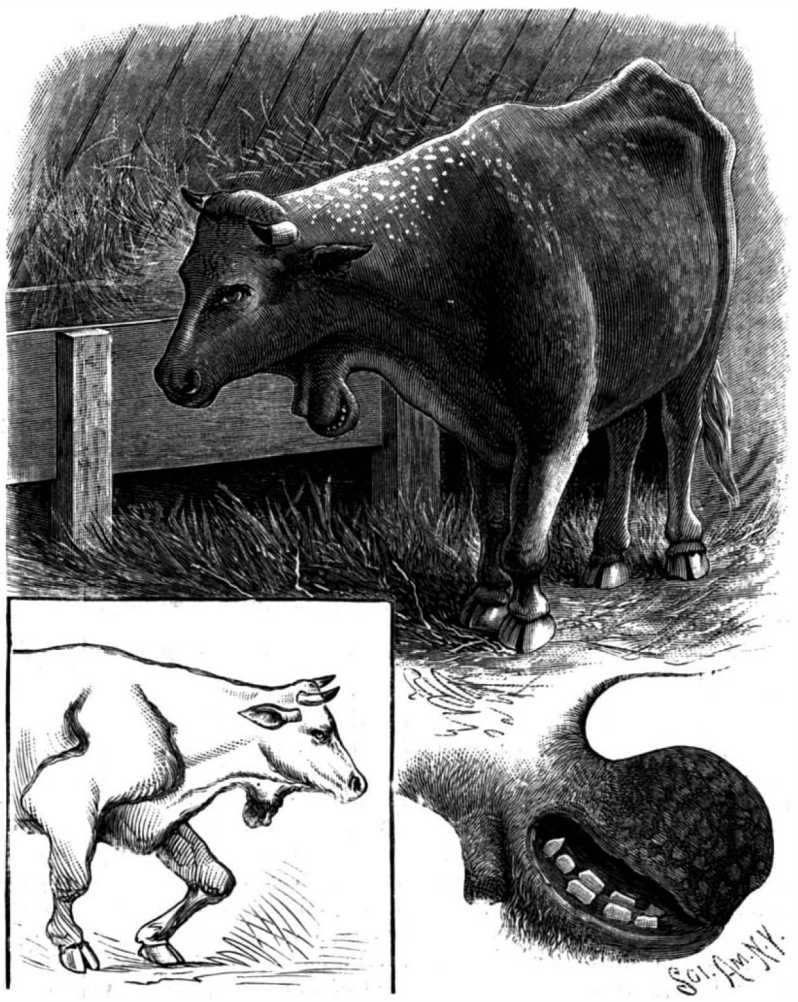
A BULL WITH TWO MOUTHS.

A New York City butcher recently came into possession of the remarkable animal shown in our illustration, being a full-grown bull with two distinct mouths. The mouth proper of the animal is used solely for eating, while the other organ is used only for drinking. The bull is about eighteen months old, weighs 1,200 pounds, and is dappled gray in color, the animal, with the exception of one shoulder and the forelegs, being well formed. The regular mouth is of normal size and contains two full sets of teeth, but no liquid ever passes between them. The other mouth, of which an enlarged view is given at the bottom of the picture, is about five inches in diameter, at the end of a protuberance three inches thick, and is situated directly under the neck, about half way between the head and shoulders. There are neither eyes nor ears in connection with this mouth, but there are nostrils, through which the animal breathes as well as through his other nostrils, and a partial set of teeth, although this mouth is only used for drinking. The animal also has double knee and hoof joints. His disposition is said to be quiet and gentle.



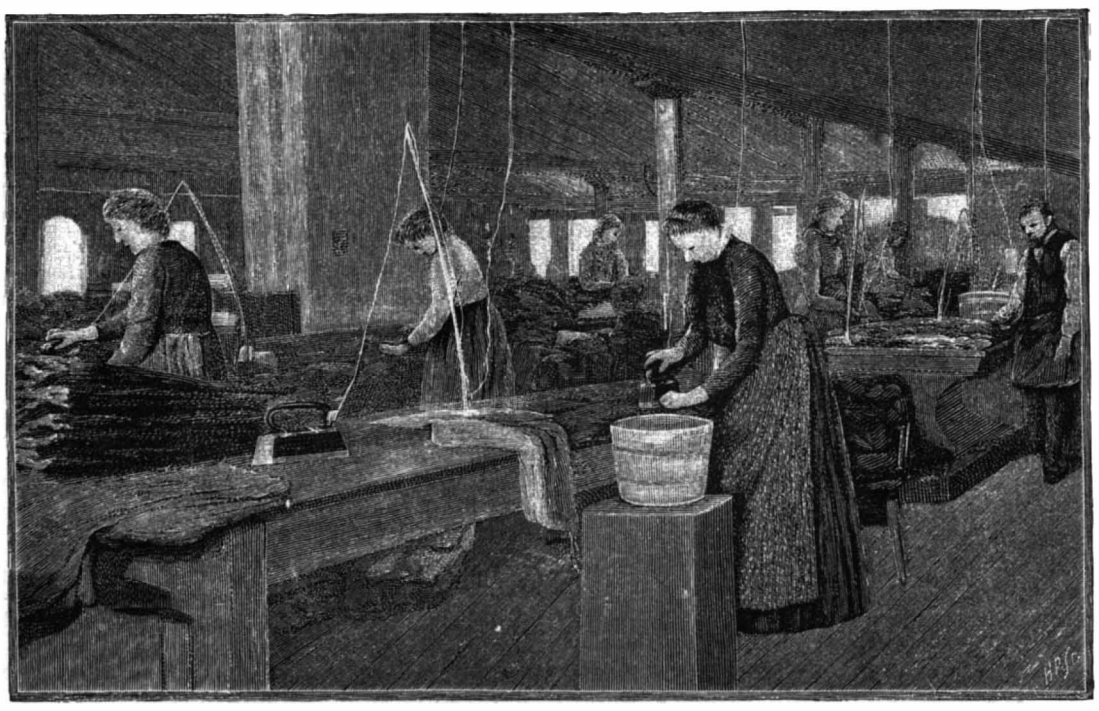
A BULL WITH TWO MOUTHS.

Tinning of Steel.

The tinning of hard steel is advocated by a writer in one of the English mechanical papers, on the ground that a bath of melted tin will not injure the temper or materially soften hardened steel surfaces, the fact being that tin melts at 442 degrees and polished steel acquires straw color at 460 degrees F. In carrying out this process the iron or steel article is first freed from scale by means of a pickle of dilute sulphuric acid and the scratch brush or sand; or, if the articles are of steel and have been quenched or hardened in oil, every trace of this is first removed by immersion in a boiling soda lye and the surface made chemically clean; even the film of oxide due to a pale straw color will prevent the perfect adherence of the tin to the steel. The bath consists of one part hydrochloric acid to about twenty parts of water; in this the article is held for a few seconds by means of a pair of brazing tongs, then withdrawn, and, while still wet, immersed instantly in a ladleful of melted tin, the surface of this being kept from oxidizing by a flush of good, clean tallow. Care is necessary not to overheat the tin beyond the proper melting temperature, and in less than half a minute the article, when withdrawn, is found completely tinned.

ELECTRICALLY HEATED SAD IRONS.

The applications of electricity to the uses of the arts are augmenting with surprising rapidity, and many of these applications are of an ingenious and interesting nature. One of the latest electrical improvements is the heating of pressing irons, which has been introduced in the clothing factory of F. P. Seavey & Co., Minneapolis, and which we illustrate from a photo plate given in the *Western Electrician*. The general method of conducting the electricity into the pressing iron is seen in the foreground of our picture. A spring rod stands upon each table, and to this rod the electrical wires are connected, running thence into the pressing iron as shown. The electrical current is made to pass through a zigzag wire resistance composed of a large amount of wire, which is so arranged within the pressing iron as not to come in contact with any portion of the shell of the iron. The resistance wire is raised to incandescence by the electrical current, and the caloric thus generated heats the pressing iron to the required degree. The interior of the pressing iron contains what is termed a compressing plate, and this, with other devices, constitutes such an arrangement of parts that the electrical resistance increases with an increase of temperature, and the apparatus is made self-regulating, so far as temperature is concerned. When the working parts are cold, the resistance cannot become much heated until the compressing plate becomes hot, which reacts upon the resistance, raising its temperature, which in turn increases its resistance and checks the flow of current. The plant was installed by the Carpenter-Nevens Electro-Heating Company, of Minneapolis. C. E. Carpenter is the inventor of the irons which are used in the factory. In addition to pressing irons, the invention is applied to a number of household appliances.



ELECTRICALLY HEATED SAD IRONS.

It has heretofore been thought by practical electrical engineers and others that electric heating could not be economical with the present method of producing current. While there is twice as much heat in gas and other means of heating as electricity, the electric heater is still economical, from the fact that, if properly constructed, all of the electrical energy supplied to such apparatus can be used in doing useful work, while with gas, for example, this is not the case. This fact will be appreciated in considering the great loss in the heating of such utensils as sad irons. For example, in laundries where gas is quite generally used for this purpose two irons are used with one operator. The surface of these irons is radiating heat, the one losing heat for this reason while being heated, and the other losing heat from the top and sides, principally by radiation while in use, and by conduction in evaporating moisture in the material ironed. It will be seen, therefore, that there are two radiations and one conduction, or three losses, which in ordinary practice are nearly equal. In the electric iron, where the top and sides of the iron do not become heated, two of these losses have been eliminated, a result which makes it more economical. The same fact may be stated regarding the use of soldering irons, especially where the heat is confined to the point of the iron.

Great saving is also found in the use of the electric current for baking griddle cakes, the electric iron consisting of a very thin plate, under which the heat is distributed almost perfectly and equally. It very quickly heats the surface plate when required for use.

The Egyptian Lions, British Museum.

Dr. Rüppell was the first who made us acquainted with the two lions in red granite which, at the time of his journey in Nubia, were lying among the ruins of the temples at Mount Barkal, near the isle of Meroë. That traveler stated that when he saw the lions, one of them was broken to pieces, and that the line of hieroglyphics which was on the base of the other could no longer be deciphered. Lord Prudhoe, who instantly perceived the value of these monuments, drew them from the ruins in which they lay buried, and carried them to England. There, after having all the fragments put together by skillful hands, this zealous patron of art and science, to whom the study of Egyptian antiquities in particular is deeply indebted, presented to the British Museum the two monuments perfectly restored, and constituting the most beautiful and noble specimens of Egyptian art. In going through the vast galleries of the British Museum, in which the masterpieces of Greek and Roman sculpture attract our eyes on all sides, and still serve as models to young artists desirous to find out the secrets by which the great masters of ancient art have rendered their productions immortal, we are everywhere carried away with admiration, particularly when, on entering the great hall of the marbles of the Parthenon, we find ourselves at once carried back to the age of Pericles, at which time the arts of Greece had reached their perfection. But these impressions, though augmented by the good taste which has arranged all the objects, will not prevent the visitor from stopping with reverential awe before the two lions of red granite which guard on each side the entrance to the grand gallery containing the colossal monuments of ancient Egypt, couched on their pedestals, the one lying on his right, the other on his left side, with their heads turned toward the spectator; they seemed more like petrified animals than the work of a sculptor. I do not believe that there exists in any European museum any monument so likely to change the opinion of those who see nothing in Egyptian art but a servile and tasteless imitation of forms consecrated by religion in the infancy of art and civilization, and who ascribe to the influence of the Greeks whatever traces of an elevated style are to be found in Egyptian monuments. It was this prejudice which led M. Rüppell to conclude, while he stood in the midst of the finest remains of the times of the Pharaohs, that these lions must have been sculptured under the influence of the Greeks. But if the royal names inscribed on their breasts seem to approach the age of Psammetichus, there are still inscriptions enough on the bases of the two monuments to prove to us that they ascend at least to the seventeenth century before our era, and that we certainly admire in them productions of the best epoch of ancient Egyptian sculpture, monuments which have resisted the ravages of more than five and thirty centuries.
—*C. Leemans.*

THE largest grain elevator in the world was built at Minneapolis Junction in 1886. The building is 336 feet long, 92 feet wide, and 175 feet high. It has storage capacity for 2,000,000 bushels of grain within its walls. During its construction the carpenters and joiners used over 6,500,000 feet of lumber of all kinds, besides thirty-two car loads of nails, which, if packed, would make the enormous amount of 10,000 common kegs; the best calculators say that the actual number of nails used in the mighty building will fall but few, if any, under 20,000,000. The engine used is capable of handling 175,000 to 200,000 bushels of grain per day, or enough during the year to equal the combined products of the State of Minnesota and the two Dakotas. Two hundred and fifty cars have often been loaded at this elevator in ten hours.

TO make paint stick to bright metal tin roofs, sand paper the metal.

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REPRODUCTION OF AN OLD POMPEIAN RESIDENCE.

The remarkable burial of Pompeii by the ashes thrown up during a volcanic eruption of Mt. Vesuvius, A. D. 79, and the uncovering of a large portion of the buried city within recent years, have furnished us with much information that was unattainable from any other source, as to the social condition and surroundings and the manner of living among the better class of Romans of eighteen hundred years ago. The city was but little over a hundred miles from Rome, in Southern Italy, in a location of unsurpassed beauty, and was a fashionable resort of the noble and wealthy, so that a large proportion of the buildings were on a magnificent scale and lavishly decorated. The manner in which the city was buried by the ashes had the effect of preserving, to a great extent, the actual form and appearance of all objects just as they were on the day of their entombment in the ashes of the volcano, many of the inhabitants being suffocated and their tolerably preserved remains fixed in the positions occupied by the individuals at the time in their several avocations. On this account excavations on the site of the buried city have been prosecuted with unusual interest, and in their revelations we seem to be brought face to face with actual life at a time when the glory of imperial Rome was at its height.

One of the many private houses thus uncovered by the excavations was the "House of Pansa," which has become among the best known from its great extent and the completeness of its plan. This structure has now been reproduced in Saratoga Springs by Mr. Franklin W. Smith, of Boston, the builder of the Moorish Villa and the Hotel Cordova at St. Augustine, Fla., and our illustration represents a view made direct from a photograph taken in the new-old house. The difficulties of the task have been very great, but they have been overcome by the employment of capable artists and the making of repeated visits to Pompeii, together with studies of the various collections in the Italian museums and the British Museum. Our view represents what is called the *peristylium*, a central court or hall with twelve columns inclosing a space with Pan and satyr among the verdure. Here were given private entertainments, when the colonnade was festooned with garlands of roses and gay with birds of gorgeous plumage.

Generally the houses of this period consisted of but one story, but with extra sleeping rooms over a part of the structure, and thus one such residence occupied a large ground area. On the roof of the front part of the building is the "solarium," or sun terrace, caryatides supporting trellises and vases alternating with them holding vines which grow in trained festoons around the roof garden.

On entering the vestibule the visitor is greeted by a fierce dog in reproduction mosaic. Beneath is the warning "Cave Canem." On the walls are brackets holding busts of "The Great and the Good," including Cicero, Socrates, Plato and Homer. Drawing aside rich portieres, "Salve" in mosaic welcomes the visitor into the *atrium* or main hall. A bewildering vista stretches before him. Across the marble pavement to the fountain, through the *tablinum* to the group of pillars of the peristyle, across the *vecus* or banquet hall, to the rear walls of the *hortus*, or garden, nearly two hundred feet, the eye vainly struggles to absorb the details of ornament.

The beauty is enhanced by rich vases, frescoes, bronzes, statuary and foliage, scattered in harmonious profusion in the main courts and in the wide halls opening on either hand. Passing through the spacious halls and courts, the visitor can follow in detail the life of the Roman noble, from his worship before the Temple of Jove in the Forum to the utensils of his kitchen or his pleasures, represented by carved ivory tickets, to his seat in the amphitheater. Every household article is executed with an artistic grace which reaches the acme of elegance. Even colanders and frying pans are decorated with graceful designs. The taste of these details proves a study of Greek art by the makers, whereas in our mechanical age the skill of the artisan rather than the artist is exemplified in household chattels.

VIEW IN A POMPEIAN HOUSE OF EIGHTEEN HUNDRED YEARS AGO, AS REPRODUCED AT SARATOGA SPRINGS, N. Y.

Toughness in Cast Iron.

Some specimens of cast iron, which exhibit unusual properties, produced at one of the great stove manufactories in Albany, N. Y., have excited much interest, the pieces, of metal being about 1 inch in width, ⅛ inch in thickness, and some 15 or 18 inches in length. Of these strips, some were twisted so as to form spirals, and others were wrapped upon coils. That cast iron can be made very tough, and even a certain amount of elasticity be imparted to it, is, of course, well known, but it is unusual, if not unprecedented, for any metal employed in stove foundries to bear such tests as those thus indicated. The twisting and bending in this case were done hot, there being nothing in the specimens but a judicious mixture of good irons and the absence of old scrap—the fact being also stated that the irons in question represent the daily meltings of the foundry from which they came, all the stoves produced there having their plates of the same metal which exhibits this peculiar toughness. It is not asserted that, because the metal will bear a torsional strain of the kind described, it is, therefore, unbreakable, there being, of course, a limit to its remarkable elasticity.

The Transfer of Industries.

The transfer of industries is one of the most strongly marked and distinctive features in modern industrial life. Its economic causes are to be found in the exhaustion of local supplies, the development of new areas, and the changing centers of commercial distribution. The industrial decline of New England is in obedience to the laws named. Its iron and steel manufactories are largely things of the past. A few years ago, three-fourths of the steam boilers made in the country were made in New England. Machine shop, planing mill machinery, and steam engines were among its most prominent and thriving industries. Now they are bought in Pennsylvania and Ohio.

The oldest iron manufacturing works in Massachusetts is being transferred to Kentucky. It was founded by Cyrus Elder, who was an expert in the making of gun metal, and in the South Boston Iron Works produced the best of naval, siege, and field guns. Some 200 men are employed at these works, and the removal of the plant is not a consequence of trade stagnation, but the necessity of getting nearer to the base of its supplies of coal and ore. Proximity to the source of supply is in many cases the only escape from the intense and ruthless competition of modern times, and what is true of the iron industries is applicable to all other branches of manufacture.

The deportation of manufactures from the Eastern States to the West and South will largely change the old centers of wealth and industry. These displacements may entail some local misfortune, and break up some time-honored establishments, but in a general and national sense the distribution of industries is an economic necessity and an industrial blessing.—*Age of Steel.*

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The International Medical Congress in Berlin.

An interesting event in the medical world has been the meeting of the International Medical Congress in Berlin, and the medical exhibition in connection therewith. We give a brief abstract from the *Lancet:*

The medical exhibition was opened on Saturday, August 2, in the central hall of the Exhibition Palace, in the park between Berlin and the northwestern suburb, Moabit. The Home Minister, the Minister of Commerce, the Rector of the University, the Belgian envoy, Dr. Weber, of Besancon, Surgeon-General Professor Kelsch, of Paris, the anatomist Teichmann, of Krakow, the members of the organization committee of the congress, and many other eminent medical men and official dignitaries were present. The hall was filled by members of the congress and others specially interested in the exhibition. The band of the Czar Alexander's Prussian Grenadiers opened the ceremony with Beethoven's hymn, "The heavens are telling the glory of God."

Dr. Oscar Lassar, the indefatigable secretary of the exhibition committee, addressed the assembly. After a short allusion to the value of special exhibitions, especially of those of a scientific nature, he described the difficulties with which the present exhibition has had to contend. The success of the enterprise had been due in a very great measure to the participation of the Prussian Ministry of War, the Imperial navy, the Bavarian government and the Imperial Office of Health. Synthetic chemistry, pathology, microscopy, and the whole apparatus auxiliary to the tending of the sick were eminently well represented. The task of the committee was now ended, and he handed the catalogue as a symbol of the transference of the whole exhibition to Privy Councilor Professor Virchow, who accepted it in the name of the organization committee.

Professor Virchow, in addressing the assembly, commended the resolution and perseverance of the minister of religion, education, and medical affairs, who had always shown a firm determination to make the exhibition an accomplished fact at all costs. Almost all the governments in the world had interested themselves in the enterprise, but especially Germany had shown herself worthy of the occasion in the most praiseworthy manner. The Emperor himself, though unfortunately prevented from being present in person, regarded the congress with sympathy, and the Empress took a very great and practical interest in all hospital matters. He, therefore, begged the assembly to join him in the cry, "Long life to his Majesty the Emperor William!" When the loud cheers and the tones of the national anthem had died away, Professor Virchow declared the exhibition opened.

Privy Councilor Koehler, director of the imperial office of health, then welcomed the assembly in the name of the imperial and of the Prussian government.

The audience then rose, and were conducted by the gentlemen of the committee, amid the strains of the march in Tannhauser, through the spacious halls of the exhibition.

The opening of the Medical Congress, which took place in Renz's Circus, on Monday, August 4, was a magnificent affair. A multitude of many thousands filled the spacious amphitheater. The places on the arena were reserved for the official dignitaries and the most eminent members of the congress. Of the latter may be named Billroth, Nothnagle, Albert, Meynert, Stork, Winternitz, and Kraft-Ebing, from Austria; Paget, Lister, Macewen, Horsley, Semon, Pavy, Clark, MacCormac, Brunton, and Ord, from England; Bouchard, Dujardin-Beaumetz, Le Fort, Richet, Proust, Apostoli, Ollier, Chauveau, Cornil, Roux, and Nicaise, from France; Mosso, Celli, Baccelli, Cantani, Maragliano, Golgi, and Foa, from Italy; Thiry and Van Beneden, from Belgium; Stokvis, Pel, Snellen, Guye, Forster, Rosenstein, and Pekelharing, from Holland; Lange, Iversen, and Gent, from Denmark; Laache, Heiberg, and Klauss Hanssen, from Norway; Holmgren, Axel Key, and Retzius, from Sweden; Kocher, Socin, Prevost, Fehling, Fick, Huguenin, and Dufour, from Switzerland; Erisman, Heryng, Kraepelin, Schmidt, Barfurt, Unverricht, Dehio, and Danilewski, from Russia; Wood, Knapp, Billings, Bernays, Senn, Keen, Sayre, O'Dwyer, Jacobi, Osler, Stewart, and Loomis, from America. Spain, Portugal, Roumania, Greece, Turkey, Egypt, Japan, Mexico, Texas, Brazil, and Chili are also represented.

The diplomatic corps was numerously represented, the German government by Minister Von Boetticher and State Secretaries Maltzahn and Oehlschlaeger, the Prussian by Gossler, Herrfurth, and Miguel, and the army by Generals Pape and Rauch. The city of Berlin was represented by Burgomaster Forckenbeck and many councilors and deputies, several German universities by their rectors and deans in their official robes. Duke Karl Theodor, of Bavaria, who is an eminent ophthalmic surgeon, and Professor Virchow were greeted by loud clapping of hands, which was repeated when Professor Virchow mounted the platform to declare the congress opened.

Professor Virchow commenced his address by describing the preparations for the congress, and begged indulgence for whatever defects there might be. He had first to welcome the foreign guests, whom he rejoiced to see before him in such numbers, and of such eminence. "One," he continued, "who had occupied a public chair in German universities for more than forty years, who recalls to memory numerous losses of the best friends, with whom he has worked, whom he has himself helped to educate, may well deem himself fortunate, if he sees again in this brilliant assembly men who were his teachers, if he beholds living before him representatives of almost all the schools of medical thought which have arisen since then, the originators of almost all the path-opening discoveries which have transmuted the outer form and the inner nature of our science from top to bottom, the greatest investigators and the first practitioners—if he finds again among the professional brethren who have gathered here from far and near old pupils who have imbibed the spirit of the new time, and developed it to most powerful effect. Yes; I may well say it is a happy day on which it is permitted me, honored by the good opinion of the last congress, and supported by the confidence of my countrymen, to open this congress in the city to which my public endeavors have been devoted for so many years. And therefore I bid you all, from the bottom of my heart, joyfully welcome in my own name, and at the same time in that of the whole organization committee. Be assured that you will be received as dear guests everywhere in our country."

The secretary of the congress delivered his report on the internal affairs of the assembly. No fewer than twenty-three states, he said, are represented in the congress. Amid enthusiastic and prolonged applause, he stated that the French republic had ordered thirty-four delegates to attend the congress, including many recognized as authorities far beyond the limits of their fatherland. Besides the official representatives, about 2,500 medical men from Germany were announced, and the number of the foreign guests was about the same. From North America 500 were present, from Russia and England 300. About 1,000 ladies had come. The secretary further stated that Edison's representative would demonstrate his new method of destroying stone concretions by electricity.

In the name of the German empire and by order of the Emperor, Secretary of State Von Boetticher welcomed the assembly.

In the name of the Prussian government, Minister Von Gossler welcomed the congress.

In the name of the city of Berlin, Burgomaster Von Forckenbeck welcomed the assembly. He gave a condensed account of the development of the public hygienic institutions of the city.

Dr. Graf then welcomed the assembly in the name of the German Societies of Physicians and Surgeons, whose great aim was the improving the position of the profession.

After the secretary of the last Washington congress had spoken, Sir James Paget ascended the platform amid loud applause. He expressed the thanks and assured the assembly of the sympathy of his countrymen. He was followed by the French delegate, Dr. Bouchard, who in a few hearty words conveyed the good wishes of his countrymen. The Italian delegate, Dr. Baccelli, expressed his gratitude to the congress, the empire, and the president in eloquent classical Latin. The Hungarian delegate, Csatary, greeted the congress in fluent German, and the representatives of Russia and Greece did likewise, after which a representative of the South American states addressed the assembly in Spanish. On Dr. Baccelli's motion, Professor Virchow was then elected president by acclamation. The following honorary presidents, among others, of all nations, were then elected—Duke Karl Theodor of Bavaria, Paget, Grainger Stewart, Stokes, Billings, Bouchard, Csatary, Billroth, Baccelli, Holmgren, and Stokvis.

In the section of gynæcology and obstetrics, the president, Dr. Martin (Berlin), in a brief address, welcomed the members. Dr. Galabin (London), who was to have opened the discussion on "Antisepsis in Midwifery," not being present, an abstract of his paper was handed round, in which he insisted on the immense importance of antisepsis, and that it should be thorough—attendants, hands, instruments, etc., being rendered aseptic, douches of sublimate injections (1 in 4,000) being used. Dr. Slawjanski (St. Petersburg) presented a table showing the reduction of the mortality at his hospital since antiseptics were introduced, and spoke in favor of sublimate solution. He was followed by Stadfeldt (Copenhagen), Fritson (Breslau), Pippinskeold (Norway), Doederlein (Erlangen), who exhibited photographs of bacterial culture from cases of puerperal septicæmia, and Dr. Priestley (London), who referred to the benefit he found on a former visit to the northern hospitals of Europe from the introduction of antiseptics; he thought that obstetricians as well as surgeons owed much to Sir Joseph Lister, and recognized the great benefit to students that would follow if by antiseptics or other means large hospitals could be made as safe as small ones.

Dr. Schauta (Prague) spoke strongly in favor of the operation by Pozzi (Paris), who reserved it for exceptional cases, owing to its risk and the difficulty of being sure the adjacent tissues were not invaded, but would not employ forced retroflection. Dr. Pean's rising was the signal for a great ovation. He spoke in his usual eloquent and decided manner for ten minutes in favor of the operation, and strongly urged the advantage of forci-pressure, of which he had had a very large experience.

Sir J. Lister gave a masterly address on antiseptic treatment in surgery, and Dr. Koch one on bacteriology. Dr. Koch's address treated chiefly of what is already known. The new points were some observations on tuberculosis as observed in the fowl, and on the possible curative treatment of phthisis by drugs. In a series of experiments which he lately conducted, he found that certain bodies, such as volatile oils, and certain metallic salts, such as nitrate of silver and preparations of gold, even in very small doses (1 to 1,000,000 and even less), destroy the tubercle bacilli in a very short time, and he thus believes that it is not impossible that in the course of time some drug may be found which will effectively destroy the bacillus without injuring the body.

In the section of neurology several papers were read, one by Dr. Minor, of Moscow, on syringo-myelia being especially interesting. From a series of five cases Dr. Minor believes that often central hæmato-myelia may give rise to symptoms of syringo-myelia, and that it is difficult sometimes to distinguish the one from the other.

In the section of pathological anatomy a discussion took place on the part which leucocytes play in inflammation.

In the section of medicine Professor Leyden, in a few well chosen words, welcomed the members, and spoke of the aim of medicine. He especially dwelt on the importance of the constitutional, hygienic, and dietetic treatment, which was now receiving more attention than ever.

In the section of medicine Lepine and Grainger Stewart opened the discussion on "The Treatment of Bright's Disease," and Professors Rosenstein (Leyden), Senator (Berlin), and Aufrecht (Magdeburg) joined in the discussion. The subject having so recently been discussed at the German Congress of Medicine at Vienna, the speakers confined themselves to a few points. Professor Grainger Stewart dwelt especially on the avoidance of chills and exposure to cold, and on the dietetic treatment. The diets he was in the habit of ordering may be grouped under four heads:

Diet.	Albumen.	Carbohydrates.	Fats.
1. Ordinary	4 665 oz.	10·65 oz.	3·32
2. Large	6·86 "	13·07 "	4·6
3. Milk	3·2 "	3·84 "	2 96
4. Low	2·494 "	16·06 "	2·202

And of these the best result he obtained by combination of diets 3 and 4. Diets 1 and 2 increase the albumen and urea and are hence unsuitable. Pure milk diet may do harm by giving rise to gastric disturbance, producing constipation, hence he gives it at short intervals and diluted with water. Iron can be given to relieve the anæmia. Diaphoretics are to be recommended, and for the relief of the anasarca and dropsies, tapping with antiseptic precautions. Rosenstein does not believe that medicinal treatment does any good in Bright's disease, as there is no drug which has any effect on the albuminuria, but many drugs may do harm, especially is this the case with calomel. He advises rest in bed and judicious diet. Senator believes that in cases of interstitial nephritis, iodide of potassium will do good.

The next subject for discussion was the treatment of phthisis. The discussion was opened by Dr. H. Weber (London), who was followed by Professor Leyden, Dr. Dettweiler, and Dr. Neffzel (New York). Dr. Weber, while not underrating the value of climate, gave strong expression to the desirability of treating phthisical patients in institutions especially adapted by situation, etc. He strongly advocated the establishment of such hospitals as that at Ventnor, to be made accessible to the poorer classes. All the other speakers who followed also spoke to the same effect.

The section of surgery, neurology, and physiology combined to hear the opening of the discussion on cerebral surgery, by Professor V. Horsley. Professor Horsley's able address was fully illustrated by lantern slides, and for the guidance of the members he had drawn up tables, so that, as the subject is a very large one, special points could be discussed. Professor Horsley enumerated the various affections of the brain (fractures, hæmorrhages, inflammatory focal lesions, septic meningitis, epilepsy, cephalalgia, tumors, etc.) where surgical interference is indicated, and briefly dwelt on those lesions of the vertebral column and cord which required operation. The address formed one of the chief features of the congress, and the members testified their appreciation by rising from their seats.

In the section of medicine Dr. Adam Kiwitz gave a paper on intracranial pressure, and Drs. Ebstein and Nicolaier gave a demonstration on renal and cystic calculi produced by feeding animals on oxamid.

In the section of pathological anatomy Dr. Max Wolff showed that he had succeeded in cultivating actinomyces, and also, by inoculating rabbits with pure cultivations, in producing typical actinomycosis.

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New American Ships of War.

Under the recent act of Congress the plans for the three new battle ships are being rapidly developed and prepared. When Secretary Tracy issued his circular on the 1st of July inviting proposals to construct the ships, further details were promised for the information of bidders. The promptness with which the call was published and the general plans were announced has given much satisfaction.

The act provided that the three vessels should each have about 8,500 tons displacement. The actual plans contemplate about 9,000 tons displacement, with the same limit of cost, which is $4,000,000 each, exclusive of armament and speed premiums. This will allow a length of 332 feet on the load water line, an extreme beam of 69 feet, and a mean draught of 24. The hull is to be of steel, unsheathed, with bracket framing, and double bottom from armor shelf to armor shelf fore and aft.

The armor at the water line is a belt of steel seven feet in breadth and eighteen inches thick, with an added one and a half inches behind the wood backing. The transverse armor at the ends of the belt will be fourteen inches thick, while from the belt to the main deck there is five and a half inch armor on the side, backed by a broad bunker of coal. A curved three inch armored deck extends fore and aft from the ends of the water line belt over the engines and boilers, its edges meeting the ship's sides below the water line. Above this deck come the heavy redoubts and barbette turrets, protecting the loading positions of the guns. It is clear, therefore, that these vessels are to be heavily armored, in the true modern sense.

The battery of each vessel will mark a great advance over anything yet attempted in our navy, consisting of four 13 inch, four 8 inch, and four 6 inch breech-loading rifles. The 13 inch guns will be in barbette turrets, 17 inches thick, and with the armor inclined so as to offer a resistance of 19 inches to horizontal fire. The barbettes and shields of the 8 inch guns will be 6 inches thick, and those of the 6 inch guns 4 inches thick. The secondary batteries will include twenty-eight guns, consisting of twenty 6 pounder and six 1 pounder rapid-fire guns and two Gatlings. Twelve torpedoes will be carried.

The speed will be at least fifteen knots, maintained for four consecutive hours, and produced by twin-screw triple-expansion engines of 7,000 indicated horse power under natural draught and 9,000 under forced draught. At least 400 tons of coal will be carried, and the act of Congress requires a coal endurance of about 5,000 knots at the most economical rate of speed. There will be a single military mast, with two tops, and there will be an armored conning tower. The bids for these vessels may be on plans provided by the Navy Department or on those submitted by the bidder.

Not less interesting in its way is the protected cruiser of 7,300 tons, in which speed is the chief object aimed at. Although the act of Congress calls for the very high rate of twenty-one knots, Chief Engineer Melville has been planning to secure twenty-two knots, although only twenty-one will be guaranteed by the contractor. For this purpose no less than 20,500 horse power, or much more than double what is required of the new battle ships, will be needed. Coil boilers have been thought of for a part of her boiler equipment, and the new device of three screws, each connected with a separate triple-expansion engine, as in some of the latest French and Italian ships, is relied upon to aid in producing the expected speed. The chief protection for this vessel, in addition to its great supply of coal, which is 750 tons, arranged in bunkers so as to shield the machinery, will be an armored deck of about four inches maximum thickness. The armament of this cruiser is inferior to that of some smaller but less swift vessels, the main battery consisting only of four 6 inch rifled breech loaders and eight 4 inch rapid-fire guns. Like the three battle ships, and the two other large vessels recently contracted for, she will have a belt of woodite or an equivalent material on the slopes of her protective deck.

Taking together the three battle ships, this very fast protected cruiser, the fast 8,100 ton armored cruiser, whose construction was awarded to Cramp & Sons two months ago, and the 5,500 ton unarmored cruiser, whose construction was at the same time awarded to the Union Iron Works, the work of the present summer will be represented by half a dozen of the finest vessels of their class in the world, whose completion may be looked for in 1893, or in 1894 at the furthest.

THE National Library in Paris is the largest in the world. It contains 2,500,000 volumes.

JAPANESE PORTIERE OR CURTAIN.

There is a certain delicacy in a curtain made of long lashes formed of straw or bamboo and beads which is not found in a fabric of any kind. Curtains of this sort have been largely introduced into this country of late, some of them being simple, plain, and cheap, while others are really very elaborate, and, of course, correspondingly expensive. It is a very simple matter to make a curtain of this class, provided the materials are at hand; but where neither bamboo nor straw nor beads are available, it becomes more difficult. But a very presentable curtain may be made from paper, which is obtainable everywhere. The large engraving shows a very simple pattern made of straws of different length, and glass beads of different colors, strung on strong thread or fine, strong twine.

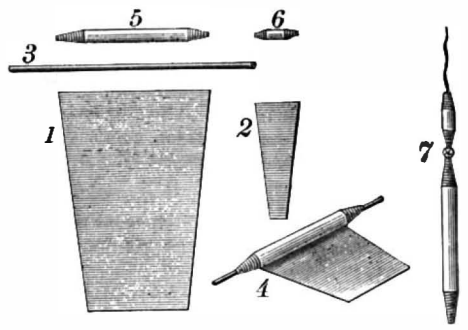

Fig. 2.—METHOD OF MAKING PAPER ROLLS.

The first thing to be done toward making the curtain is to draw a design roughly on a sheet of paper, then tie a thread in a bead which is to form the finish of the lower end of the lash. Then the bead is fastened in its place on the pattern by driving an ordinary pin through it into the board or table beneath. The stringing of the straws and beads is thus proceeded with according to the requirements of the pattern.

When one lash is finished, its upper end is fastened on the design by an ordinary pin driven through a knot tied in the thread. The next lash in order is proceeded with in the same manner, and so on until the entire series of lashes is done. A stout string is stretched along the series of pins by which the upper ends of the lashes are secured. Each thread is then tied around the transverse string. If desired, the threads may be spaced by beads arranged on the string between the lashes. As all the knots are necessarily trimmed close, it is well to touch each knot with mucilage. When this is dry, the curtain is finished.

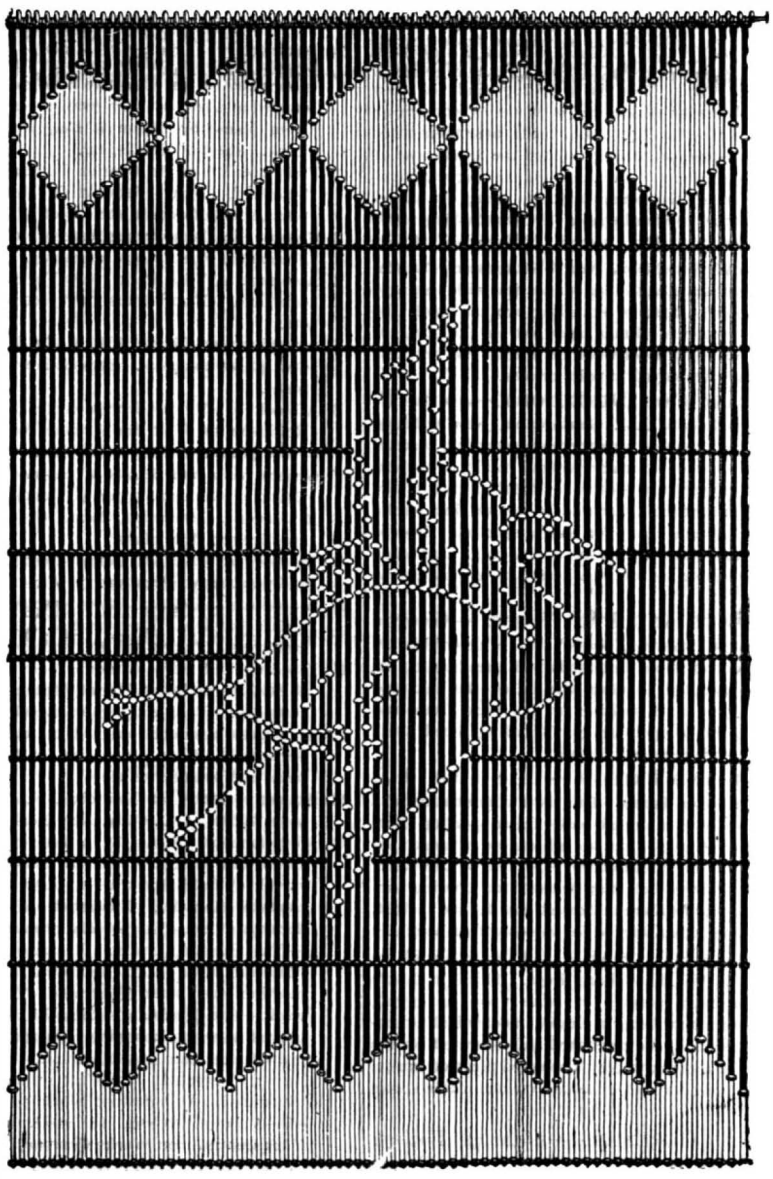

Fig. 1.—CURTAIN FORMED OF STRAW, BAMBOO OR PAPER, AND BEADS.

A very handsome curtain may be made from beads alone, or from beads and plain uncolored straws, or the straws may be dyed different colors by means of aniline dyes, or by dipping them into thin colored lacquers.

A curtain or portiere of bamboo and beads is made in the same way, but on a larger scale.

It is easy to make a good imitation of these curtains with paper tubes and beads, or the tubes alone. The manner of making these tubes is shown in Fig. 2. The paper from which the tubes are made should not be thicker than common writing paper. It may be either colored or white. The best results will be secured by using common white writing paper and coloring the tubes after they are formed, and dry by means of thin brown or white shellac varnish, colored with pigments or the anilines.

The pieces of paper from which the tubes are made are preferably cut in trapezoidal shape, as shown at 1 and 2, so that when the tube is finished it will have conical ends, as shown at 5, 6, and 7. The wire shown at 3 is used as a mandrel upon which to roll the paper. The larger end of the piece of paper is applied to the wire when the paper is rolled up in the manner illustrated at 4. The narrower end of the paper is gummed and pressed down closely, when the wire is removed and the operation is repeated. It is not advantageous to gum the entire surface of the paper. Fastening at the end is sufficient. The wire used as a mandrel should not be more than one-sixteenth inch in diameter, as too large a hole through the rolls allows them to arrange themselves irregularly. At 7 is shown a part of a lash formed of a long tube, a bead, and a short tube.

In stringing both the straws and the paper tubes a long, slim needle will be required. If this is not obtainable, a very good substitute for it may be made by forming an eye or loop on the end of a thin wire of suitable length.

There is scarcely any limit to the amount of labor that may be expended upon an article of this kind; but very pleasing results will be secured by the adoption of simple designs, which may be easily carried out.

Machine for Mounting Photo Prints.

It consists of a box of any required dimensions, divided in the middle and hinged at the back, so that one half forms a lid to the other. This is fixed firmly to the work table. On opening it, both top and bottom are found to be subdivided by partitions into as many reservoirs as are necessary for holding each a packet of mounts in the upper half and trimmed prints in the lower compartments. When loaded, and ready for commencing to mount, the box is thrown open, and the packet of prints is found to be pressed up from below, so that the upper one is level with the upper surface of the lower compartment, and having received an application of the mountant from a slab and brush, which are found adjacent, the lid is closed, and a stirrup or foot piece depending from the table is relieved from the pressure of the foot, by which certain springs are allowed to exercise their force, the result being that the starched prints are brought into firm contact with their respective mounts. On reopening the top the mounted prints fall out and are received into a receptacle lined with blotting paper, by which any humidity left on the face of the print is removed, after which they are dropped into a tray standing in readiness to receive them. The starch is then applied to the next set of prints, and the springs liberated by the action of the foot as before, and thus it goes on so long as any prints and mounts remain.

How to Destroy Germs in Water.

Dr. C. G. Currier says, in the *Medical Record*, that water is easily sterilized by keeping it at or near the boiling point for fifteen minutes. Five minutes' heat is sufficient to destroy all harmful micro-organisms. Still less time suffices to destroy the disease-producing varieties which are recognized as liable to occur in water. Thus merely raising to the boiling point a clear water containing the micro-organisms of malarial disorders, typhoid, cholera, diphtheria, or of suppurative processes, and allowing it to gradually cool, insures the destruction of these germs. They are also destroyed by keeping the water for from a quarter of an hour to half an hour at a temperature of 170° C. Occasionally, however, very resistant but harmless bacteria may get into water. The brief heating renders them safe for eating purposes; but when it is desired to destroy every micro-organism that may be present in a contaminated water, it should be heated for one hour and allowed to cool slowly. It may then be used for cleansing wounds, or for alkaloidal solutions, which will keep indefinitely if no germs be introduced after the solution has been heated.

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RECENTLY PATENTED INVENTIONS.

Engineering.

ENGINE. — Adolf F. Stephenson, Stromsburg, Neb. Combined with a supporting frame in which a shaft is mounted are radially arranged cylinders within the frame, the pistons being connected to a single crank arm of the shaft, and the steam chests mounted on the frame outside the cylinders, the engine being designed to utilize the steam to the greatest advantage and be run at a high rate of speed.

STEAM ACTUATED VALVE. — Johann C. Grabner and Henri Ruperti, of Kupferhammer, near Brackwede, Germany. This invention relates to cylinder and piston motor engines, and is designed to dispense with the devices heretofore employed to distribute the steam, and to effect its distribution directly from the source of supply alternately to the ends of the cylinder and piston, the device being applicable to single and double acting engines.

FEED WATER HEATER. — Cleophas Cancienne, Bertie, La. Combined with a boiler feed pipe arranged in a furnace chamber is an independent detachable core having radial arms serving as supports for holding the core centrally in the pipe, the construction providing an unusually large area of heating surface relative to the quantity of water passing through the supply pipe.

REVERSING VALVE. — Augustus L. Engelbach, Leadville, Col. This invention consists of a slide valve and a semi-cylindrical valve seat on which the slide valve operates, and which is mounted to be turned in the steam chest, the valve being simple and durable in construction, effective in operation, and permitting of quickly reversing the engine at any time.

Railway Appliances.

PORTABLE STALL. — John W. Evers, Rahway, N. J. This is a stall for use in railroad cars, etc., for the transportation of horses and cattle, and designed to be readily set up and knocked down, consisting of a series of posts each having a screw rod for fastening them in place, partitions to be hooked on opposite posts to form the sides, an auxiliary post to lock the animals in place, and feed bags or troughs held on this post.

CAR COUPLING. — Robert L. Breth, Homer City, Pa. Combined with the drawhead is a gate, and a lever connected therewith through the medium of a link that works in a vertical slot in the drawhead, a housing covering the slot and having an aperture through which one arm of the lever passes, the invention being an improvement on a former patented invention of the same inventor.

Mechanical.

DIE STOCK. — James M. Carpenter, Pawtucket, R. I. This die stock has guides to hold a bolt in position so that the thread will be accurately cut thereon, the guides having an easy means of operation, there being also provision made for fixing the position of the guides and regulating their friction.

SHEARS.—William G. Koelsch, Albany, and Philip Shafer, Bath-on-the-Hudson, N. Y. By this invention novel means are employed to secure tension of the two blades in juxtaposition with and as they pass each other, a spring tension catch engaging with the joint pin, restraining the latter from turning and throwing the friction and wear upon the head of the pin.

CROSSCUT SAW. — Wiliam A. Miller, Wapinitia, Oregon. This invention covers a peculiar conformation of the teeth and the manner of setting them with regard to the blade of the saw, whereby the saw is designed to cut rapidly, with but little frictional resistance, the saw requiring less filing than saws in ordinary use, and being manufactured without increased expense.

PLANE. — Otto Skattebo, Hannaford, North Dakota. In this plane a longitudinal guide is adapted to be held parallel with or at any desired angle to the stock, a separable hinge joint connecting the two parts when the guide is to be held at an angle, and there being rods and set screws for holding the guide in the desired position, the device being equally efficient as a square or bevel plane, and one in which a great variety of tools may be inserted, as for matching, rabbeting, grooving, beading, etc.

KNIFE SHARPENER. — John Vermeulen, New York City. Combined with a casing having a transverse slot are transverse sharpening rollers within the casing at opposite sides of the slot, and having exterior to the casing toothed operating wheels, with means for locking the wheels against turning, the device being simple and durable in construction, convenient to use, and very effective.

KNIFE POLISHER.—John Vermeulen, New York City. This is a device in which the knife is polished by inserting and moving transversely its blade between two polishing straps, which are supplied with polishing material from an inclosed hopper, the pressure of the polishing straps upon the blade being adjusted by a screw as desired.

SOLE TRIMMING MACHINE.—Jacob R. Scott, Nyack, N. Y. This is a machine designed to cut the loops of the fair stitching thread under the channel cover of the under side of the sole, so that the channel cover can fold on to and be fastened to a smooth surface, the invention consisting of a cutter mounted to turn, and provided with a flange and a spring-pressed table supporting the sole presented to the cutter.

MAKING CAST STEEL INGOTS.—Richard B. H. Leighton, Philadelphia, Pa. By this invention the mould pit, fitted with suitable moulds, is placed in a frame above or near rotatable rollers grooved to fit the ingots that fall from the moulds so that the metal may be released from the moulds and passed through the rollers before it becomes fully set or hardened, whereby a solid rolled ingot or finished bar is produced, free from pipe or sponginess.

Miscellaneous.

WAGON BODY. — Zachariah F. Jones, Scottsville, Va. This is a wagon body so constructed as to be easily taken apart and put together section by section, thus enabling it to be handled by one man, and also permitting its storage in small space when taken apart.

AXLE LUBRICATOR.—John N. Pringle, Belleville, Ontario, Canada. This lubricator is for the axles of vehicle wheels, the hub having an opening with which the lubricator nipple communicates, a cap or top being threaded on the lubricator, while a screw presser is threaded within the lubricator body to force tallow, axle grease, or other lubricant out on the axle spindle, the turning of the wheel distributing the lubricant.

CARTRIDGE SHELL RELOADER.—Charles A. Hussey, Fort Bidwell, Cal. This is a simple, cheap, and durable implement for quickly loading shells, providing means for the ready removal of the exploded cap, for placing in position a cap or primer, for imparting a steady and uniform pressure to wads arranged above the powder and shot and for the holding of the cartridge head when the exploded cap is removed and a new cap put on.

FLUX OR SOLUTION FOR COATING METALS.—Brady S. Richardson, Scottdale, Penn. This invention provides a method of coating articles of iron or other metals with a regular, smooth, and even coating of lead, without previously giving to the metal any preparatory coating or galvanizing, the lead forming a closely adherent coating which amalgamates with the iron and renders it unoxidizable.

BRICK DRIER.—Phineas Arnold, Canal Dover, Ohio. This drier preferably has three compartments under one roof and independent of one another, whereby the process of drying may be carried on in one compartment while the next is being emptied and another filled, or the drying may be carried on in one while the others are idle, means being also provided for drawing off the saturated air from the material in process of drying.

A PUMPING ATTACHMENT. — Winfield S. Overton, Whitestone, N. Y. This is an automatic attachment to be applied to an ordinary buoy or to a vessel, to be operated by the movement of either as it rides upon the waves, to distribute oil upon the water when applied to a buoy, and when applied to a vessel to keep it free from water.

MAKING WIRE BRACES. — Luna J. Aderhold, Waco, Ga. This invention provides a machine comprising a bed or support, wire-holding devices, and a revolving lever carrying a fixed guide at one end and twisting devices at its opposite end, to quickly and effectually bend up and straighten wire into V braces suitable for use as bed and fence braces.

METAL CEILING.—Henry S. Northrop, New York City. This is a ceiling made of thin stamped sheets or plates, and is made by combining adjoining plates having parallel beads near their outer edges and flanges projecting beyond the beads, one of the flanges overlapping the other and bearing ornamentation in relief, the ornamentations being separated from each other to afford spaces for the attaching nails.

SHINGLING BRACKET.—Thomas Levi and James W. Murchison, New Westminster, Canada. This is a bracket adapted for connection with a shingle roof to support a beam or scantling against which the carpenter or other workman may rest in shingling or repairing or doing other work on a roof, the brackets being usually employed in pairs or sets.

INDICATOR OR DIRECTORY.—John F. Deeves and Richard U. J. Gauthreaux, New Orleans, La. By this invention a rotary frame carrying a series of spring rollers on which are wound bands, in connection with a vertically slotted cylindrical casing, are employed in forming a machine to be set in a public place, and contain, ready for easy inspection, lists of residents and their addresses, a city map, and such other information as may be useful to a stranger or citizen.

INKSTAND AND PEN RACK. — George W. Lindsay, Gainesville, Texas. This is a combination device of one or more inkstands with pen-holding attachments adapted to close the lid of the inkstand when the pen is in position on the rack frame and permit the lid to open by gravity of attached parts when the pen is removed for use.

EASEL AND TRIPOD. — Kendall J. Minot, Galveston, Texas. This is a combination of a pair of cross bars, a hinged brace for supporting them at any required angle, and an adjustable arrangement for regulating the spread of the bars and of the brace, forming a device which may be used for holding phonograph horns of different sizes at any desired height, or for holding a painting, or for the use of an article.

PIANO KEY BOARD ATTACHMENT.—Casper De Vilbiss, Shellsburg, Iowa. This is a device for mechanically playing a tune upon an organ, melodeon or piano, being a simple mechanical attachment to be set over the key board and operated by the revolution of a crank to play a selected piece of music, the music being formed by knobs on removable sheets of flexible material carried by rollers.

LAWN CLEANER. — Charles Bailey, Winnipeg, Canada. This is a light and durable machine designed to effectually clear the refuse, such as grass, leaves, etc., from lawns, tennis courts, and similar places, and, when made to follow a lawn mower, to take up all the grass cut, thereby leaving the lawn or ground perfectly clear.

CHURN.—Robert Campbell, Mancelona, Mich. In this churn the cream-holding vessel is supported on the upper end of a vertical spring plate, the churning being effected by bending the spring plate to one side by means of handles on the receiver, and then releasing the handles, when the spring causes the vibration of the receiver and the concussion of the particles of cream against themselves and the sides of the receiver.

FOLDING POULTRY CRATE.—Harry B. Cornish and Samuel M. Higgason, Rutherford, Tenn. This is a crate for the transportation of poultry, which, when knocked down, will form a compact bundle, and when set up may be made firm in such position, preventing abstraction of the contents and indicating if the crate has been tampered with when in use as a shipping box or coop for live poultry.

DIPPER HANDLE. — Henry Maycock, New York City. This is a vertical handle, running down to the bottom of the bowl of the dipper, and provided with gauge marks to indicate the amount of liquid in the receptacle.

EMBALMING AND COOLING APPARATUS. —Eugene D. Whipple, Creston, Iowa. This is an apparatus for undertakers' use, adapted to be packed in small space for convenience in transportation, and which, when arranged for use, may be adjusted to any desired size.

ARTIFICIAL TEETH. — Emory A. Bryant, Aspen, Col. This invention provides for the attachment of porcelain veneers of artificial teeth to the dummies or pivot teeth, so that in case the veneers are broken they can be easily replaced without discomfort to the patient, at a small cost, and even by a dentist who has had little or no experience with bridge work.

TRUSS.—John H. Brownlow and Joel S. Warner, Ogdensburg, N. Y. This invention provides a truss whereby the tissues adjacent to the inguinal canal and rings will be compressed from both sides, the truss being also designed to secure the greatest ease and comfort to the wearer.

TOY PUZZLE. — Alfred W. Hanington and Arthur E. Southward, New York City. This invention covers an improvement in the "pig and clover" class of puzzles, and comprises a series of pens inclosed by a gated wall surrounded by an unbroken wall, a number of balls or spheres being adapted to pass through the gates of the inner wall and enter the pens.

UMBRELLA HOLDER. — Frederick W. Strong, New York City. This is a device capable of attachment to the side of a car, to the back of a theater seat, or a church pew, or to a rack, in which an umbrella may be conveniently placed and removed therefrom, and consists of a tapering tubular body with a latch door hinged at one side, a key hole slot adapted to fit on a supporting headed stud, and tubes at the bottom to conduct away water accumulating.

SCIENTIFIC AMERICAN BUILDING EDITION.

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1. Elegant plate in colors showing perspective and floor plans of an attractive little cottage recently erected at a cost of only $900 at Sunapee, N. H., from plans by Munn & Co., architects, New York. Sheet of details, etc.
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3. Chateau de Chenonceaux, erected in the reign of Francis the First. Page engraving.
4. A cottage at Villa Park, New York. Cost $3,400 complete. Floor plans, perspective elevation, etc.
5. A residence on Chester Hill, Mount Vernon, N. Y. Cost $5,500 complete. Perspective view and floor plans.
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References to former articles or answers should give date of paper and page or number of question.
Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all, either by letter or in this department, each must take his turn.
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Minerals sent for examination should be distinctly marked or labeled.

(2403) "Old Reader" asks: 1. How to make a good silver plating fluid, that will last for a week or ten days, and that will not tarnish when touched. A. Add ammonia to a solution of nitrate of silver until the precipitate first formed is just redissolved. 2. The cheapest and best way to clean tombstones, without injury to the hands, and how to apply it? A. See query 2179. 3. How to clean gilt frames. A. Wash with beer. 4. What will remove ink from paper, without injury to the paper, and how applied? A. A mixture of oxalic and tartaric acids, applied with a camel's hair brush, then wash with water applied in same way and blot with thick blotting paper. 5. What is a real good, reliable remedy to keep the hair from falling out? A. There is no universal remedy. See SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 102 and 388, on the hygiene of the hair and proper manner of preserving it. 6. How to make a preparation for etching names on steel, and will it injure the hands? I want something that will penetrate the steel enough to leave a lasting mark. How is it applied? A. Apply dilute sulphuric acid. It will not injure the hands. 7. How to prepare a liquid or powder to cure perspiring of feet, and is it harmless? A. See query 2354.

(2404) H. S. asks: 1. What is meant by vulcanized fiber? A. Fiber made by grinding or otherwise reducing wood, which is then made into shape with an intermixture of pitch and heated to make it waterproof. 2. Is parchment paper vulcanized fiber? A. No. Parchment paper is made by treating paper with a mixture of sulphuric acid 2 vols., water 1 vol.

(2405) J. W. N. asks how to make a quick-drying polish to finish wood applied without friction. A. Dissolve 4 ounces best shellac in two pints strong alcohol, add 2 pints linseed oil and 1 pint spirit of turpentine, shake and add 4 ounces sulphuric ether (common ether) and 4 ounces aqua ammonia. Shake when used and apply with a sponge lightly.

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(2406) H. D. asks (1) for a remedy for ants in a pantry. Of course, nothing dangerous to man will answer. A. Try buhach or erythrum. See our SUPPLEMENT, No. 247. 2. A receipt for rubber stamp ink, both colors and indelible. Have tried various formulas published, but all lack proper body and staying qualities when applied to the pad. The indelible inks sold and made from various formulas come out in one or two washings at laundry, though they last some months in the home wash. A. Rubber stamp ink is made from aniline colors and glycerine. As an indelible ink the best printer's ink is to be recommended. 3. How do the collar manufacturers stamp their goods so that their trade mark can never be washed out? A. We presume it is with printer's ink.

(2407) J. K. asks: 1. How can I make rubber hand stamps? The article in SUPPLEMENT, No. 83, I have found is very good as far as making mould goes. I used unvulcanized rubber, and find it sticks to mould when heated in oven. How can I vulcanize it, and prevent sticking to mould? Please explain clearly. A. The unvulcanized rubber should be mixed with vulcanizing material, such as sulphur. The mould should be coated with powdered talc. 2. How high are Niagara Falls? A. American Falls, 164 feet, Canadian falls, 150 feet. 3. What is a good way to get rid of rats? A. If the case is bad, employ a regular rat killer. 4. What is a good lubricant for a clock, that won't become gummy? A. Best sperm oil. 5. I have a straw hat, which became quite yellow in less than a month. How can I get it white again? A. Suspend by threads in a barrel, first dipping the hat in water. Then burn sulphur within the barrel, keeping it covered. 6. I made a solution of quicksilver, nitric acid, and water, which, when applied to brass, gives it the appearance of silver, but does not last. Can you tell me what else to use to make it stay, or can you give another receipt for silver wash which will not come off? A. No mercurial wash is good for anything, and it greatly deteriorates the brass. Use a solution of nitrate of silver to which ammonia has been added, just sufficient to redissolve the precipitate first formed.

TO INVENTORS.

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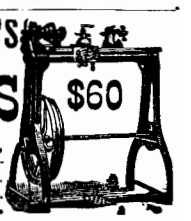

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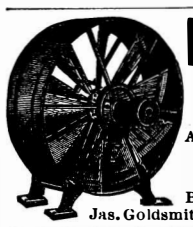

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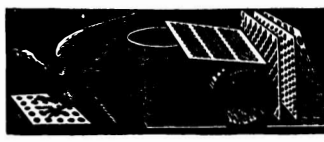

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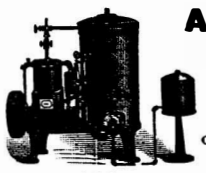

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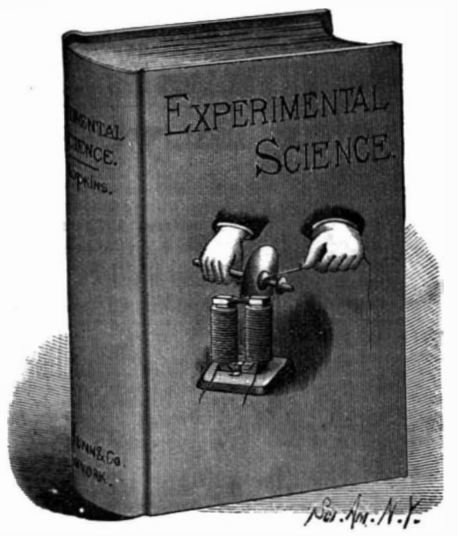

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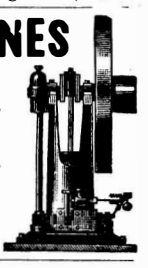

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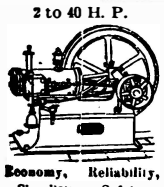

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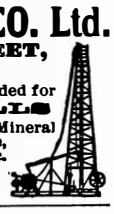

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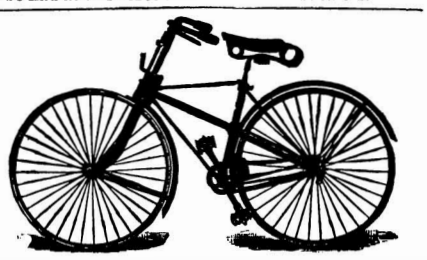

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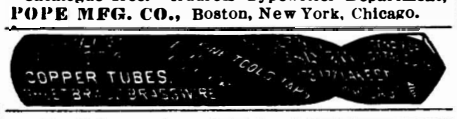

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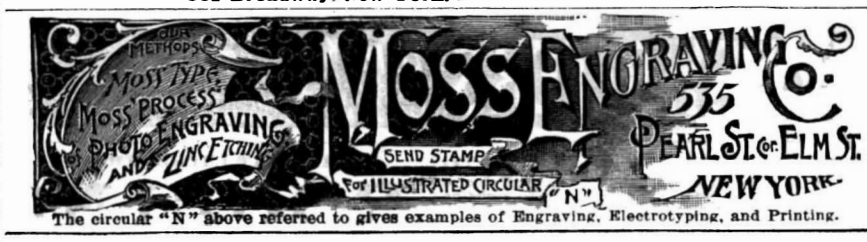

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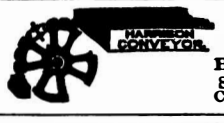

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